KoF/ÖB 2024

Faculty of Science and Technology

Research Program Self-Evaluation

|  |  |
| --- | --- |
| Research Program: | Materials Theory |
| Department: | Department of Physics and Astronomy |
| Section: | Physics |
| Program Responsible Professor: | Olle Eriksson |

|  |
| --- |
| **Goals:**   * Maintain and strengthen our **research quality**   + Through program and department self-reflection on strengths and weaknesses   + Through developing program and department priorities for the next 5 years   + Through internal and external feedback on our performance and plans * Strengthen our **collegial culture**   + By involving all research staff in the process and ensuring everyone is aware of the results   + By being respectful of everyone’s time at the faculty, department, and program levels   + By communicating clearly as to why we are doing this and how we expect everyone to contribute * Improve our **internal understanding**   + By collecting information on the different ways programs and departments are funded and operate   + By collecting explanations of why we work that way and how it supports our research * Improve our **resource usage**   + By generating bottom-up prioritized research plans at the program, department, section, and faculty-levels   + By allocating and re-allocating resources based our priorities and the potential to significantly improve research   + By identifying opportunities for intra- and inter-program/department/section collaboration and re-organization |

**Introduction**

Be sure to regularly [check the faculty KoF24 and ÖB webpage](https://www.uu.se/medarbetare/fakultet/teknisk-naturvetenskapliga/utvardering-av-fakultetens-forskning---kof) for updates, clarifications, details, timelines, and answers to common questions.

**Background on KoF and ÖB**

This evaluation combines two processes: the university-wide Quality and Renewal (KoF) process and the faculty-level Review of Base Financing (ÖB). These are being combined to avoid significant duplication of effort. However, they have different goals which makes combining them a challenge. For example, the first three goals above are KoF-focused while the last is ÖB-focused. Most importantly, KoF is a reflective process where we strive to identify both our strengths and weaknesses, while ÖB is an evaluative process where we strive to identify the best opportunities for using our resources.

This causes an inherent concern: will admitting to weaknesses in KoF make us less likely to get resources from ÖB? While there is no way to completely eliminate this concern, this evaluation has been designed with the ÖB portion focusing on identifying Priorities to improve/strengthen/broaden research while the KoF portion focuses primarily on reflecting on our processes.

This provides the ability to be open about weaknesses while ensuring prioritization of high-quality ideas, as

1. Using Priorities allows us to identify concrete opportunities to improve our research, thereby allowing reflection on not just where we are currently excellent but where we can become better, and,
2. Using an internal, bottom-up prioritization process at the program, department, section, and faculty-levels allows us to identify the most promising and high-quality proposal for potential funding at each level.

**Expectations**

There is understandably a strong focus on the “new” funds that will be allocated as part of the ÖB process. However, these funds are small in comparison to the yearly budget, and the Faculty strongly encourages everyone to look to the four goals listed on the first page for the main value of this process. Please be aware that this report will be a public document and will be placed on the faculty website for all employees to access.

**Time period**

This evaluation pertains to the period since the last evaluation: 2019-2023 inclusive. Descriptions provided by the programs should cover the full evaluation period. However, centrally provided statistics on bibliometrics (2017-2021/2022) and financial data (2022-2023) cover slightly different time periods.

**Responsibility**

The Head of Department (HoD) has the overall responsibility for the department self-evaluations and the Program Responsible Professor (PAP) has the overall responsibility for program self-evaluations. This includes ensuring that the information provided is both sufficiently accurate and not misleading. It is important to be open, even about activities that are not as successful as we may wish.

The HoD/PAP is responsible for coordinating meetings with the appropriate people, collecting input, leading appropriately broad and inclusive discussions, prioritizing among suggestions, and summarizing and producing the final text. Most economic and HR data will be provided centrally, but for the information that needs to be collected locally, the HoD/PAP is responsible for coordinating with the appropriate people. The HoD is responsible for ensuring that the programs provide drafts to the department early enough that the department can use them as input to the department’s self-evaluation.

**Panels**

The panels will provide input on how programs and departments can improve, provide new perspectives on potential organizational changes across programs and departments, help in identifying good examples that can be shared across the faculty, and place our research quality in the international context. While this input is extremely helpful for identifying directions, decisions and prioritization will be done within the faculty using the panel’s feedback as one input.

**Instructions**

**Base data**

Base data such as bibliometrics, HR and financial data will be provided centrally. Details on how the data was collected and how to interpret it will be found in the Base Data Information document on the Faculty KoF webpage.

**Note**

While it is understandable that every program and department will want to look as good as possible, this process is most valuable when everyone is open and honest. In particular:

1. Activities (funding, projects, publications, hires etc.) that ended before the evaluation period or started after it should not be included. If it is extremely important to include such, e.g., very recent recruitments that significantly affect future plans, the text must clearly indicate that the activity falls outside the evaluation period and why it is being included.
2. Cramming in more text by changing the font size, layout, margins, text box sizes, etc. will not be accepted. It is understood that the space limitations will lead to the need for careful prioritization.

The four answer sizes used are:

* Very short – 1.4cm tall box, approximately 250 characters
* Short – 3cm tall box, approximately 600 characters
* Medium – 4.7cm tall box, approximately 950 characters
* Long – 10cm tall box, approximately 2000 characters

Do not change the ordering or labeling of the questions in the document, as the final answers will be extracted from the document based on that ordering and labeling.

**Before submission**

[Check the KoF/ÖB webpage on the employee portal for any important updates](https://www.uu.se/en/staff/faculty/science-and-technology/research).

**Hide instructions**  
Modify the “Instructions” style so all colored text is hidden in the submitted document. First, check that you have the “Show/Hide Formatting Marks” turned off then right-click on the style “Instructions” in the ribbon at the top of the window. Then select “Modify” and then “Format” at the bottom left. Choose “Font” and turn on the “Hidden” option and click the OK button.

**Navigation panel**

To quickly navigate through the document, you can use the Navigation panel. To see the Navigation panel, click the “View” tab in the ribbon and then check the “Navigation Panel” checkbox in the “Show” button group or choose “Sidebar🡪Navigation” from the “View” menu. In the Navigation Panel you can view the outline of the document and search for specific words or phrases.

**Submission**

Send this document as **a Word file** to your Head of Department latest April 15, 2024. It is important to submit the document as a Word file as we will be extracting text from the tables to put all answers in a database.

**Updates**

* V4
  + Clarified in table 3.9 that Top-10 external funding shows the amount spent on each financier during the year.
  + Corrected data for some programs with regard to “UL, promoted from an adjunct” being included in the category “Other Research”. Those concerned have been informed by e-mail.
  + Updated data for the Instrumentation Research Program including FREIA.
  + Added a box where the program can ask questions to the panel.
* V3
  + Revised bibliometrics table to have only one coverage statistic (3.3.2). This statistic reflects the proportion of DiVA publications used for citation statistics calculations by CWTS Leiden, instead of reporting the Web of Science coverage (WoS coverage). For WoS coverage statistics, see the base data document. The intended goal is to put increased focus on the impact indicators and their validity.
* V2
  + **3.10 External funding sources** - Changed to include all “active” grants during the evaluation period instead of just grants that “started” during the evaluation period. This change is done to make sure that grants that show up in the financial data for 2022 and 2023 will be listed even if they did not start during the evaluation period
* V1 (initial version)

# General information

**Responsibility: PAP to communicate with all program members, discuss, prioritize, and collate. All program members to report and discuss.**

## Process for creating this self-evaluation

**Instructions**: Describe the process to generate this self-assessment, how it was collegial, and list which categories of employees (e.g., Professors, ULs, BULs, postdocs, PhDs, researchers, etc.) were significantly involved.

**Motivation: To emphasize that this is to be a collegial process and that all members of the program should be included.**

|  |
| --- |
| All members of the program (from PhD students to professors) have had the possibility to influence the content of this self-evaluation. All permanent personnel have worked commonly on the first version of the text, after which all members of the program had a chance to comment and suggest improvements to the presentation. We have during the process had regular meetings to compare where we stand. |

## Core of the research program

**Instructions**: Describe what makes the program a coherent research program. For example, shared methods, areas, questions, facilities, etc.

**Motivation: To understand the essence of the program so that its plans and activities can be better understood in that context.**

|  |
| --- |
| At the core of the program is the electronic structure theory of real materials, which is a powerful framework that enables a close-to-reality, predictive description of diverse classes of materials, ranging from strongly correlated electron systems to surfaces and to bio-molecules. On this framework, we build extensions to describe e.g. nonequilibrium spin dynamics, lattice dynamics, superconductivity, thermomagnetic, spintronic and orbitronic properties and various magnetic spectroscopies. |

## Personnel (data provided centrally)

**Instructions**: Postdocs who are on stipend should be listed separately in parentheses. (Example: if there are 4 postdocs on salary and 3 on stipend, please enter “4 (+3)”. )

**Motivation: To understand the program’s personnel distribution by career stage and gender. This data shows the number of FTEs (full-time equivalent) employees in each category.**

**Responsibility: Data provided centrally; PAP to review to ensure no significant mistakes are made. Note that stipend postdocs are not present in the university salary system and will need to be manually accounted for if they are to be included. If this table is changed to add stipend postdocs, please note the changes in the “other important program-specific comments” section below as well.**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Faculty FTEs** | | | | **Non-Faculty FTEs** | | | | | |
|  | **Professor** | **Associate (UL)** | **Assistant (BUL)** | **Total** | **PhD** | **Postdoc** | **Researcher** | **Other**  **Research** | **Other** | **Total** |
| **Female** | 0.6 |  |  | 0.6 | 3.0 | (+5) | 4.0 |  |  | 7.0 |
| **Male** | 3.0 | 2.9 |  | 5.9 | 8.3 | 3.7 (+9) | 8.0 | 0.2 |  | 20.2 |

## Finances

### Overall research funding in MSEK (data provided centrally)

**Motivation: To understand how a program is funded across the main sources of income. This data shows the long-term internal funding (FFF+SFO) vs. external (grant) research funding.**

**Responsibility: Data provided centrally; PAP to review to ensure no significant mistakes are made.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **FFF+SFO Internal Research** | **Other Internal Research** | **Total Internal Research** | **External Research** | **Total Research** | **External Research %** |
| **2023** | 9.3 | 3.4 | 12.6 | 27.3 | 39.9 | 68% |
| **2022** | 9.1 | 3.1 | 12.2 | 26.2 | 38.4 | 68% |
| **Average** | 9.2 | 3.2 | 12.4 | 26.7 | 39.2 | 68% |

### Other internal research funding

**Instructions**: If the other internal resources category above is significant, describe where it comes from: e.g., co-funding for various grants, starting packages for Assistant professors, studiestöd, department resources given, special funds from the vice rector, etc.

|  |
| --- |
| Vice-chancellor, faculty and departmental support for cofounding large external grants, e.g ERC and KAW, is important. Studiestöd is important to finance PhD students. |

### Basic funding expectations and policy for using internal resources

**Instructions**: Explain the standard funding distribution between internal research funding (FFFs), external grants, and teaching that faculty (Assistant, Associate, Professor) and non-tenure staff (researchers, adjuncts) receive. Describe the policy for distributing internal resources (FFFs and other 210 funds, including studiestöd, startbidrags, and co-funding). Include a description of how faculty members at each level (Assistant, Associate, Professor) receive research support and are funded. Explain any implicit or explicit policies regarding holding external grants and allocation of internal resources. Include a brief overview of other uses of internal resources, for example: extra support for particular roles (e.g., PAP, FUAP), startup packages (for new faculty), allocation of studiestöd, department policies for FFFs or institution resources, funding of joint facilities/infrastructure, co-funding for grants, paying for PhDs/postdocs, etc.

**Motivation: To understand how programs use their internal resources to support members and activities.**

|  |
| --- |
| In the program permanent faculty members get 40 % of their salary from FFF resources. The program also co-funds EU projects, KAW projects etc. when restraints on overhead are present due to the external grant giving organization. The division head gets an additional 25 % salary support from FFF funds. All PIs are encouraged to make applications to VR, ERC, EU, and KAW funds, and the program, is maybe the most successful one at UU in attracting trophy-like third party funding, with several ERC starting, ERC Consolidator, ERC Advanced, ERC Synergy, KAW fellow, and KAW Scholar projects. Uniquely, the program was recently (2024) granted two KAW Scholars (Eriksson and Oppeneer). |

### Use of internal research funds in MSEK (data provided centrally)

**Motivation: To understand how the program is using internal research funding.**

**Responsibility: Data provided centrally; PAP to review to ensure no significant mistakes are made.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Faculty Salary** | **Non-Faculty Salary** | **Other Personnel Costs** | **Premises** | **Equipment Depreciation** | **Overhead** | **Running Costs** | **Total** |
| **2023** | 3.4 (30%) | 4.2 (36%) | 0.1 (1%) | 0.9 (7%) | 0 (0%) | 2.3 (20%) | 0.6 (5%) | 11.5 |
| **2022** | 3.3 (30%) | 4.1 (38%) | 0.1 (1%) | 0.8 (7%) | 0 (0%) | 2.1 (19%) | 0.4 (4%) | 10.8 |
| **Average** | 3.4 (30%) | 4.2 (37%) | 0.1 (1%) | 0.8 (7%) | 0 (0%) | 2.2 (20%) | 0.5 (4%) | 11.2 |

### Personnel funding (data provided centrally)

**Motivation: To understand how funding is used across different employment categories and genders. This data shows how staff are funded on average across internal and external research funding as well as teaching.**

**Responsibility: Data provided centrally; PAP to review to ensure no significant mistakes are made.**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Female** | | | **Male** | | |
|  | **Internal** | **External** | **Teaching** | **Internal** | **External** | **Teaching** |
| **Professor** | 55% | 0% | 45% | 44% | 27% | 29% |
| **Associate (UL)** |  |  |  | 50% | 20% | 30% |
| **Assistant (BUL)** |  |  |  |  |  |  |
| **PhD** | 69% | 31% | 0% | 41% | 51% | 8% |
| **Postdoc** |  |  |  | 0% | 100% | 0% |
| **Researcher** | 10% | 89% | 1% | 1% | 85% | 14% |

### Major infrastructure usage

**Instructions**: Identify the five most significant research infrastructures used by the program. For this purpose, infrastructures are resources that are too expensive for an individual PI to afford and are therefore organized and funded as shared resources. Specify the level of sharing (program, department, university, national, or international) and whether it is located at Uppsala or elsewhere. Provide the approximate amount spent to pay for development of or access to the infrastructure each year, including both program funds and PI grant expenditures. Infrastructure costs should not include travel to the infrastructure (as travel for research is not infrastructure-specific) nor salary time while using the infrastructure (as research time is not infrastructure-specific), but can include salary costs of engineering staff and explicitly agreed upon in-kind salary contributions. If infrastructure is paid for outside of the program, specify who pays for it instead of the cost. (E.g., write “Faculty” or “VR”.) Note that it is not necessary to provide exact values, but please make an effort to be within ~10%.

**Motivation: To understand what important infrastructure is being used and how much it costs and to support the faculty’s ongoing work on developing an infrastructure policy**

**Responsibility: PAP in discussion with program members, economic administrator for costs.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Infrastructure** | **Sharing** | **Location** | **Approximate Yearly Cost (MSEK)** |
| NAISS (National Infrastructure for Supercomputing in Sweden) | National | elsewhere | NAISS grants |
| NAISS LUMI (Large Unified Modern Infrastructure) | International | elsewhere | NAISS grant |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

## Other important comments

**Instructions**: Explain any important issues not addressed above or misrepresented by the above data that need to be clarified for the panel to give valuable feedback. If the program has an important role in supporting the university or department, such as a mandate from the government or university, please describe it here. Please keep these precise and relevant.

**Motivation: To bring important and special issues to the view of the panel and department.**

|  |
| --- |
| The program is exceptionally successful in attracting third part funding from sources like ERC, EU and Knut and Alice Wallenberg Foundation, where co-funding is necessary. A strategy for co-funding within the university/faculty/department to solve this issue positively would be desirable. |

# Follow up on goals set in the last evaluation

**Responsibility: PAP to communicate with all program members, discuss, prioritize, and collate. All program members to report and discuss.**

## Reflections on accomplishments and setting goals this time

**Instructions**: Reflect on whether the goals from the last evaluation (ÖB Section D1 for programs and KoF17 Section 1b for departments) were appropriate in retrospect, what has been accomplished towards them since the evaluation, and what we can learn from them about setting effective goals this time. The previous evaluations [are available on the faculty KoF webpage](https://www.uu.se/en/staff/faculty/science-and-technology/the-facultys-research-evaluation---quality-and-renewal---kof24) to support this reflection for the programs, departments, and panels.

**Motivation: Try to learn from what we did last time to be able to set more effective goals this time.**

|  |
| --- |
| Since the past seven years, the Materials Theory division has split its personnel (then some 80 persons) into two roughly equally sized units; the Theory of Quantum Materials Program (Black-Schaffer) and the Materials Theory Program (Eriksson). This has been very successful and the activity is growing with respect to number of members, examined PhD students, external funding (last round of KAW Scholar projects as well as regular KAW projects, five come from this activity), and high-profile publications. |

# Area 1: Research Quality (evaluation of outcomes and processes)

**Responsibility: PAP to communicate with all program members, discuss, prioritize, and collate. All program members to report and discuss.**

## Main research areas

**Instructions**: List the largest research areas in the program, including approximately what percent of the program’s total research they cover, the approximate number of FTE faculty (Assistant/Associate/Professor, split according to their approximate activities and not double-counted), and whether the research is mostly Applied, Basic Science, or Mixed. These four areas combined should be broad enough to cover at least 75% of the program’s research activities.

**Motivation: To understand the program’s research heterogeneity and how the program sees its own research profile and to help in assigning panel members.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Main Research Areas** | | **% of program** | **FTE Faculty** | **Type** |
| **1** | Atomistic spin dynamics and lattice dynamics | 25 | 2 | Basic science |
| **2** | Electronic structure of strongly correlated materials | 15 | 1.2 | Basic science |
| **3** | Microscopy and Spectroscopy theory and simulations | 20 | 1.6 | Basic science |
| **4** | High throughput electronic structure calculations | 15 | 1.2 | Basic science |

## Research Activities

**Instructions**: Describe the key research activities in the program. This should focus on the types of research done, with the important results described later in the Research Results section. Briefly describe how the research is important for science and society. Describe how the program balances incremental (e.g., safe, easy-to-publish) research with higher-risk projects with more potential for breakthroughs. Note that the limited space will require prioritizing the text based on the main research activities listed above.

**Motivation: Provide a more detailed view of the key research directions in the program.**

|  |
| --- |
| The program in Materials Theory is known to have a world-class research environment built around 40 senior researchers/teachers, postdocs and PhD students. The research can be characterized as curiosity driven basic science but also multi- and inter-disciplinary as well as applied science. Activities range from ab-initio electronic structure calculations of functional materials and strongly correlated electron systems, high-throughput strategies to non-equilibrium phenomena and topological states of matter. Both in-house- and existing state-of-the-art codes are used in parallel to the development of new theoretical methods and computational techniques. Topics investigated include, but are not limited to, electronic structures, high-throughput methodologies, transport properties, atomistic spin-dynamics, ultra-fast magnetization dynamics, quantum entanglement, graphene, 2D materials, nano-biophysics, unconventional superconductivity, elastic and inelastic scattering of electrons, materials for sustainable energy, orbitronics and spintronics.  At the division we foster a culture that encourages challenging science, i.e. high impact research instead of easy-to-publish incremental work. Experience shows that ‘higher-risk’ projects will create plenty of good science along the way.  The research conducted is important for both science and society for several reasons. It advances basic science through curiosity driven inquiries, laying the foundational knowledge necessary for technological innovations. The division's multi- and interdisciplinary approach enables the tackling of complex problems that span across traditional disciplinary boundaries, fostering innovation and the development of novel theoretical methods and computational techniques. Applications of this research are vast and could directly impact societal needs. For example, the development of new materials for sustainable energy addresses global challenges related to energy security and climate change. |

## Research Results

### Contributions to the field

**Instructions**: Describe the research results that the program is particularly proud of that indicate the quality and breadth of the research. Explain the importance of the program’s contribution to the field in the international context.

**Motivation: Identify the results the program is most proud of and provide the program’s perspective on how important they are. This allows the panel to see how the program sees itself and provide feedback to help the program better understand how it is viewed internationally.**

|  |
| --- |
| Atomistic spin dynamics simulations, theory for ultrafast demagnetization and all-optical switching, theory of electron magnetic circular dichroism, self-consistent theory of multichannel superconductivity, including spin fluctuations and phonons, theory of odd-frequency superconductivity and vertex-corrected superconductivity, ab initio theory of magnetic/electric multipoles in solids, theory for Hidden Order, ab initio theory for orbital Hall effect and orbital Rashba-Edelstein effect, theory of non-equilibrium electron-phonon dynamics and of electron-magnon dynamics, theory of ultrafast spin currents and THz emission. Electronic structure theory of Gilbert damping and inertia. Theory of light and current induced magnetism. Ab initio theory for molecule-substrate interaction. Theory for correlated electronic structures and spectroscopy, with dynamical mean field theory and its extensions. Theory of self-consistent ab-initio lattice dynamics. Theory of skyrmions and skyrmion dynamics, predictions of new 2D materials. Theory of elastic and inelastic scattering of electrons. |

### Bibliometrics for 2017-2021/2022 (data provided centrally

**Motivation: Provide an overview of how the program is performing that is reasonably comparable to other programs and departments. (See the Base Data definitions file for the meaning of each statistic.)**

|  |  |  |
| --- | --- | --- |
|  | **Type of Indicator** | **2017-2022** |
| **Number of publications, full publication set (full / fractional counts)** | **Quantity** | 1105 / 378 |
| **Proportion of publication fractions at the Norwegian model level 2 (%)** | **Impact** | 37% |
|  |  | **2017-2021** |
| **Coverage (fractionalized): Proportion of publications from DiVA included in citation statistics, weighted by fractional counts** | **Coverage** | 75% |
| **Mean normalized number of citations per publication (MNCS)** | **Impact** | 1.09 |
| **Proportion of frequently cited publications (top 10%) (PP(top 10%))** | **Impact** | 10% |

### Most frequent publishing channels (raw data provided centrally)

**Instructions**: Using the provided raw data of publication frequency per channel (a channel is the name of a conference or journal) for each program, list the most frequent publishing channels with more than two publications during the evaluation period. This data can be found in the Base Data Excel document.

**Motivation: To see where the program is most frequently publishing.**

|  |  |  |
| --- | --- | --- |
| **Channel** | **Number** | **% of Total Publications** |
| PHYSICAL REVIEW B | 168 | 15.2 |
| THE JOURNAL OF PHYSICAL CHEMISTRY C | 50 | 4.5 |
| SCIENTIFIC REPORTS | 47 | 4.3 |
| PHYSICAL CHEMISTRY, CHEMICAL PHYSICS - PCCP | 39 | 3.5 |
| JOURNAL OF PHYSICS: CONDENSED MATTER | 32 | 2.9 |
| PHYSICAL REVIEW MATERIALS | 28 | 2.5 |
| APPLIED SURFACE SCIENCE | 24 | 2.2 |
| ACTA MATERIALIA | 18 | 1.6 |
| ACS APPLIED ENERGY MATERIALS | 17 | 1.5 |
| COMPUTATIONAL MATERIALS SCIENCE | 17 | 1.5 |
| JOURNAL OF MATERIALS CHEMISTRY A | 17 | 1.5 |
| ACS APPLIED MATERIALS AND INTERFACES | 16 | 1.4 |
| APPLIED PHYSICS LETTERS | 13 | 1.2 |
| JOURNAL OF ALLOYS AND COMPOUNDS | 13 | 1.2 |
| JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS | 13 | 1.2 |
| NANO ENERGY | 13 | 1.2 |
| PHYSICA. E, LOW-DIMENSIONAL SYSTEMS AND NANOSTRUCTURES | 13 | 1.2 |
| PHYSICAL REVIEW LETTERS | 13 | 1.2 |
| INTERNATIONAL JOURNAL OF HYDROGEN ENERGY | 12 | 1.1 |
| JOURNAL OF APPLIED PHYSICS | 11 | 1.0 |
| NATURE COMMUNICATIONS | 9 | 0.8 |
| MATERIALS AND DESIGN | 9 | 0.8 |
| NANOSCALE | 9 | 0.8 |
| SCIENCE ADVANCES | 9 | 0.8 |
| JOURNAL OF CHEMICAL PHYSICS | 8 | 0.7 |
| PHYSICAL REVIEW RESEARCH | 8 | 0.7 |
| ULTRAMICROSCOPY | 8 | 0.7 |
| RSC ADVANCES | 7 | 0.6 |
| CARBON | 6 | 0.5 |
| ELECTROCHIMICA ACTA | 6 | 0.5 |
| JOURNAL OF MATERIALS CHEMISTRY C | 6 | 0.5 |
| JOURNAL OF PHYSICAL CHEMISTRY LETTERS | 6 | 0.5 |
| NEW JOURNAL OF CHEMISTRY | 6 | 0.5 |
| PHYSICA STATUS SOLIDI. B, BASIC RESEARCH | 6 | 0.5 |
| PHYSICA. B, CONDENSED MATTER | 6 | 0.5 |
| SCRIPTA MATERIALIA | 6 | 0.5 |
| SUSTAINABLE ENERGY AND FUELS | 6 | 0.5 |
| APL MATERIALS | 5 | 0.5 |
| APPLIED MATERIALS TODAY | 5 | 0.5 |
| CATALYSIS SCIENCE AND TECHNOLOGY | 5 | 0.5 |
| CHEMISTRY OF MATERIALS | 5 | 0.5 |
| INORGANIC CHEMISTRY | 5 | 0.5 |
| JOURNAL OF PHYSICS D: APPLIED PHYSICS | 5 | 0.5 |
| JOURNAL OF SOLID STATE CHEMISTRY | 5 | 0.5 |
| MATERIALS TODAY BIO | 5 | 0.5 |
| NANOMATERIALS | 5 | 0.5 |
| NANOSCALE ADVANCES | 5 | 0.5 |
| NANOTECHNOLOGY | 5 | 0.5 |
| PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA | 5 | 0.5 |
| SUPERLATTICES AND MICROSTRUCTURES | 5 | 0.5 |
| ACS APPLIED NANO MATERIALS | 4 | 0.4 |
| ACS NANO | 4 | 0.4 |
| CATALYSTS | 4 | 0.4 |
| CHEMICAL PHYSICS LETTERS | 4 | 0.4 |
| CHEMPHYSCHEM | 4 | 0.4 |
| ENERGY AND FUELS | 4 | 0.4 |
| JOURNAL OF MATERIALS SCIENCE AND TECHNOLOGY | 4 | 0.4 |
| MATERIALS TODAY COMMUNICATIONS | 4 | 0.4 |
| NEW JOURNAL OF PHYSICS | 4 | 0.4 |
| PHYSICAL REVIEW A. ATOMIC, MOLECULAR, AND OPTICAL PHYSICS | 4 | 0.4 |
| SOLID STATE COMMUNICATIONS | 4 | 0.4 |
| ADVANCED FUNCTIONAL MATERIALS | 3 | 0.3 |
| ADVANCED MATERIALS | 3 | 0.3 |
| ADVANCED THEORY AND SIMULATIONS | 3 | 0.3 |
| CHEMISTRY - AN ASIAN JOURNAL | 3 | 0.3 |
| INTERMETALLICS | 3 | 0.3 |
| JOURNAL OF MATERIALS SCIENCE | 3 | 0.3 |
| JOURNAL OF PHYSICAL CHEMISTRY A | 3 | 0.3 |
| JOURNAL OF POWER SOURCES | 3 | 0.3 |
| JOURNAL OF SUPERCONDUCTIVITY AND NOVEL MAGNETISM | 3 | 0.3 |
| LANGMUIR | 3 | 0.3 |
| MATERIALS | 3 | 0.3 |
| MATERIALS RESEARCH EXPRESS | 3 | 0.3 |
| MATERIALS TODAY : PROCEEDINGS | 3 | 0.3 |
| NANO LETTERS | 3 | 0.3 |
| RESULTS IN PHYSICS | 3 | 0.3 |
| SURFACE SCIENCE | 3 | 0.3 |

### Most important publishing channels

**Instructions**: Provide the most important publishing channels (a channel is the name of a conference or journal) according to the program, the number of publications in each channel during the evaluation period, and the % of the total publications based on the centrally provided bibliometrics. For each channel, specify both the total number of publication and the number where a program member was the lead-author. (The lead-author is the primary driver of the particular publication, which is often denoted as the “corresponding” author or the first author in the publication list, and is typically the originator of the core idea of the work and/or the person who wrote the majority of the text in the publication.)

**Motivation: Enable the program to indicate what publishing channels they see as most important and how much they publish in them for panel feedback.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Channel** | **Number** | **% of Total Publications** | **Lead-author** | **Lead-author % of Total** |
| Nature Communications | 9 | 0.8 | 3 | 0.27 |
| Physical Review B | 168 | 15.2 | 102 | 9.2 |
| Physical Review Letters | 13 | 1.2 | 2 | 0.18 |
| Journal of Physical Chemistry Letters | 5 | 0.45 | 1 | 0.09 |
| Acta Materialia | 18 | 1.6 | 16 | 1.4 |
| Nature | 1 | 0.09 | 0 | 0 |
| Nature Materials | 1 | 0.09 | 0 | 0 |
| Science | 1 | 0.09 | 1 | 0.09 |
| Ultramicroscopy | 8 | 0.7 | 8 | 0.7 |

### Publishing impact on the field

**Instructions**: Describe the impact of the program’s publishing on the field by elaborating on the provided bibliometrics, the most frequent publishing channels, and the self-identified most important publishing channels. Explain the importance of the program’s contribution to the field in the international context. (See the Base Data definitions file for the meaning of the bilbiometric statistics.)

|  |
| --- |
| The fact that most papers are published in journals such as Physical Review B and Scientific Reports ensures high visibility among scientists in the relevant field, and equally important, these journals allow for a detailed description of the methodology and steps of the study, making the research more reproducible for other researchers.  High-ranking journals like Nature and Science, mainly focus on the presentation of results and impact on a broad field. Methods are described in less detail. Publications in these journals are reserved for ground breaking science and new ideas to be in-depth studied in the above mentioned journals. |

### Participation, recognition, and leadership in the field

**Instructions**: Describe how the program interacts with the larger field in terms of its participation (e.g., through collaborations, professional organizations, positions of trust, etc.), recognition (e.g., through awards, keynote presentations, etc.), and leadership (e.g., through steering positions in international organizations, professional bodies, etc.) in the field. Explain the importance of the program’s contribution to the field in the international context.

|  |
| --- |
| Review panel positions of trust: reviewer for EU projects (Fet-Open, Pathfinder, ITN), ERC-Advanced Grant panel member, ERC-Starting and -Consolidator Grant panel member, Mercator Fellow of the Free University, Berlin, DOE SLAC review panel member, member of Int. Advisory Committee & Co-organizer of Joint European Magnetic Symposium, and of the European Magnetism School, member of Advisory Committee of SCES. Reviewer of DOE, NSF (USA) projects, of FOM, NWO (Netherlands), ANR (France), FNR (Luxembourg), SNSF (Switzerland), FWF (Austria), UK-RI (Great Britain), FNRS (Belgium), NCN (Poland), GACR (Czech Rep.), ISF (Israel), Royal Society (New Zealand), DFG (Germany), KAW advisory board, KAW project evaluation panel, KAW Scholar panel, Co-Director of KAW program WISE (budget: 300 MEuro) and on evaluation panel of The Helmholtz Directorship in Juelich, Germany, on the Icelandic Research Council and the Estonian Research Council.  Reviewer for Professor appointments in Germany, UK, Sweden, India, Saudi Arabia, USA, docent qualifications and lecturer appointments in Germany, Austria, Sweden.  Awards to members of the program include The Göran Gustafsson Prize, The Thureus Prize, Ingvar Carlsson Award, Edlundska priset, Celsiusmedaljen, Lindbomska belöningen, Rudbeckmedaljen, Microscopy Innovation Award from MSA. |

## Synergies within the research program

**Instructions**: List up to three examples of synergies (interactions that provide more value than the individual contributions alone) within the research program itself that can be seen through specific on-going collaborations. Synergies can include using similar or complementary methods, facilities, partners, goals, etc. Briefly describe the synergy and extent of the current collaboration. Due to the limited, programs will need to work internally to identify the collaborations that are most important to the program.

**Motivation: Identify how the program’s diversity supports its research.**

|  |  |  |
| --- | --- | --- |
| **1** | **Type of synergy** | Complementary theoretical methods |
|  | **Specific**  **collaboration** | Role of lattice vibration in laser induced ultrafast demagnetization process |
| **2** | **Type of synergy** | Complementarity in mathematics and numerical expertise |
|  | **Specific**  **collaboration** | Calculations of Heisenberg exchange parameters from ab-initio theory |
| **3** | **Type of synergy** | Complementarity in theoretical and numerical expertise |
|  | **Specific**  **collaboration** | Efforts in correlated electronic structures and for atomistic spin-dynamics |

## Synergies across research fields

**Instructions**: List up to three examples of synergies (interactions that provide more value than the individual contributions) the research program has with research fields other than those of the program itself. Synergies can include using similar or complementary methods, facilities, partners, goals, working across theory/experimental, grants together with people in different fields, etc. These synergies can be here in Uppsala or at other universities. Provide the university (cross-field synergies within Uppsala are fine) and the different field, and briefly describe what the synergy is and the extent of the specific current collaboration. Due to the limited space, programs will need to work internally to identify the collaborations that are most important to the program.

**Motivation: Identify current activities that are broader than the research programs to promote broader research initiatives and understand what is done across Uppsala vs. externally.**

|  |  |  |
| --- | --- | --- |
| **1** | **University and Field** | Uppsala University – Depts. of Chemistry and Materials Science + Engineering |
| **Type of synergy** | Working across theory and experiment, common grant |
| **Specific**  **collaboration** | SSF project; material prediction, synthesis, and characterization in a circular fashion, provided analysis of new materials, far beyond the capability of a single program |
| **2** | **University and Field** | Radboud University Nijmegen (The Netherlands), University of Hamburg (Germany) |
| **Type of synergy** | Complementary theoretical methods |
| **Specific**  **collaboration** | FASTCORR (ERC Synergy Grant); develop numerical approaches and theoretical foundation for correlated materials; expertise from across groups is crucial for this. |
| **3** | **University and Field** | Chalmers University of Technology |
| **Type of synergy** | Theory-experiment collaboration |
| **Specific**  **collaboration** | 2D magnetism, spin-orbitronics |

### Reflections on synergies across research fields

**Instructions**: Reflect on the program’s initiatives and challenges with regards establishing research activities that cross between the program’s field and other fields. Are there particular benefits to such collaborations or particular costs? Describe the formal and informal initiatives the program takes to encourage these and the pros and cons of working within and outside of Uppsala.

**Motivation: Understand how the program views its synergies across research fields.**

|  |
| --- |
| Collaborations between different experimental divisions exist within the department, along with other experimental groups in Chemistry and Biology departments. Also, collaboration exists between the two programs within Materials Theory Division. Several collaborations exist with other Swedish institutions, e.g., Chalmers, Lund, KTH, Gothenburg, Stockholm, Örebro etc.  Benefits: Broader expertise, complementary methods provide deeper insight in materials and physics behind.  Costs: Many prestigious projects e.g. from the EU lack full coverage of overhead. Even more severe if non-staff member (researcher) is the PI (no access to FFF). |

## Reflections on ensuring good research ethics

**Instructions**: Reflect on the program’s initiatives and challenges with regards to ensuring good research ethics. Describe the formal and informal initiatives the program takes to teach and promote good research ethics across all research staff, and what particular challenges the program faces in these regards.

**Motivation: Understand how the university’s priority for ensuring good research ethics is addressed.**

|  |
| --- |
| The program ensures good research ethics by following the faculty regulations regarding education of the research/teaching staff. For PhD students an ethics course is compulsory and the senior members have attended several courses such as “pedagogisk grundkurs”. |

## Reflections on creating and ensuring research freedom

**Instructions**: Reflect on the program’s initiatives and challenges to create and ensure research freedom. Describe the formal and informal initiatives the program takes to create opportunities for research freedom across all research staff, and what particular challenges the program faces in these regards.

**Motivation: Understand how the university’s priority for ensuring research freedom is addressed.**

|  |
| --- |
| The basic meeting form of the program is a common seminar series that the MT- and TQM-programs have hosted for several decades. This is a well visited event where one speaker of the MT division presents her or his research project (in some cases an external speaker is present). Support for research efforts is typically given here, and people are encouraged here to collaborate on research projects. In general, the personnel are very free to pick up what research direction they are interested in, with the caveat that people employed under a specific research project funded by third party actors, need to work on this project being successful. |

## Reflections on research program size

**Instructions**: If the research program has 4 or fewer faculty (Assistant, Associate, Professor), describe the program’s process for ensuring a sufficient critical mass of faculty long-term, current and planned activities in this direction, and discuss whether there are other programs where collaboration could be of assistance. Similarly, if the research program has 10 or more faculty members, describe how the program works to develop a coherent research agenda and collaborations. If the program has between 5 and 9 faculty, describe if increasing or decreasing the size could be beneficial.

**Motivation: A reasonable number of faculty members is required for research programs to achieve their purpose of providing a collegial environment that can develop and support diverse ideas and knowledge around a shared core research direction. For research programs with very few faculty, or very many, it is important to reflect on how this can be achieved.**

|  |
| --- |
| The Materials theory program has 4 Professors and 5 Associate Professors. This size is ideal for pursuing science with a core research direction (theory of materials) with diverse directions of top-notch research areas. This also gives ample opportunities for internal collaborations to strengthen the quality of research. |

## Top external funding sources (data provided centrally)

**Motivation: To see the amount spent on each financier during the year.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Funding Agency** | **2022** | **Funding Agency** | **2023** |
| Swedish Research Council (VR) | 11.9 | Swedish Research Council (VR) | 13.5 |
| European Research Council (H2020) | 2.9 | Wallenberg Foundation (KAW) | 7.6 |
| Wallenberg Foundation (KAW) | 6.4 | European Research Council (H2020) | 3.0 |
| Swedish Foundation for Strategic Research (SSF) | 2.1 | Olle Engkvist Foundation | 0.9 |
| EU commission (H2020) | 1.4 | EU commission (H2020) | 0.8 |
| Other non-profit (outside the EU) | 0.4 | G Gustafssons stiftelse | 0.8 |
| Olle Engkvist Foundation | 0.3 | Swedish Energy Agency | 0.3 |
| Carl Trygger Foundation | 0.2 | Other private companies (Swedish) | 0.1 |
| Uppsala University Foundations Management | 0.1 | STINT | 0.1 |
| Swedish Energy Agency | 0.2 | Uppsala University Foundations Management | 0.1 |

## External funding sources

**Instructions**: List the source and number of significant research grants to the program during the evaluation period. Include only grants that awarded at least 3M SEK to a program member and were active (used) during the evaluation period (2019-2023, inclusive). If a program member was awarded at least 3M SEK, but was not the PI on the grant, list the grant on a separate line and state “Co-PI”.

**Motivation: This list complements the top external funding sources by providing consistent data for significant (>3M SEK) basic science grants available to all programs and by identifying the number of PIs vs. the total amount of funding. This is important as the absolute amount of money available to different fields varies enormously.**

|  |  |
| --- | --- |
| **Grant** | **Number of awards to PIs in the program** |
| **Basic science grants (available to all fields in the faculty)** | |
| **ERC-StG, ERC-CoG, ERC-AdG, ERC-SyG** | 1 |
| **KAW Project** | 2 |
| **KAW Scholar** | 3 |
| **WAF/WAFx** |  |
| **VR Project** | 11 |
| **VR Starting** | 4 |
| **Other grants (may include field-specific grants and Co-PIs)** | |
| KAW Project co-PI | 2 |
| SSF Ingvar Carlsson Award | 1 |
| EU Projects | 2 |
| VR Center of Excellence | 1 |
| Energimyndigheten | 3 |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

## Reflections on external funding

**Instructions**: Reflect on what the program expects from its staff (Assistant, Associate, Professor, postdoc, and researcher levels) in regards to applying for and receiving external funding, how the program communicates those expectations, how the program supports staff in applying for funding through feedback and mentoring, and what opportunities and challenges the program sees in the future for continued and new external funding. Describe initiatives the program takes to form consortia to apply for larger grants.

**Motivation: Connect how the program works with external funding to the achieved funding results.**

|  |
| --- |
| Expectations are that all faculty members apply for external funding, primarily VR, but also other calls in line with their respective research profile. Senior faculty, in particular PAP, discusses and gives feedback to younger (Postdoc/Forskare) level staff. The program acknowledges the challenge in attracting large grants, e.g. ERC, in particular for younger researchers. All members are encouraged to attend UUs grant workshops. |

## Reflections on what is working well

**Instructions**: From the above, reflect on what is working well and should be continued over the next 5 years.

**Motivation: Require programs to identify where current activities are successful. This will provide the panel with insights into our own self-assessment.**

|  |
| --- |
| The Materials Theory program is successful in attracting external funding and publishing in high quality research journals. There is a wide range of external collaborations between members of Materials Theory program and research groups worldwide. Internally, the program works on several complementary methods and fields, which often leads to internal synergies among groups led by different PIs. |

## Reflections on what needs to be improved

**Instructions**: From the above, reflect on what needs to be improved over the next 5 years. Please focus on areas that need improvement and do not list areas that could be improved but where it is not needed.

**Motivation: Require programs to identify where they feel that they need to invest. This will both provide the panels with insights into our own self-assessment as well as help us improve.**

|  |
| --- |
| While the Materials Theory Division has been successful in attracting significant external funding, the faculty-based funding has been relatively low. A stronger faculty funding would support the scientific research and would provide more academic freedom to pursue novel research directions. Some of the grants listed above require co-funding that becomes a burden for a single research program. |

# Area 2: Career Paths (evaluation of processes)

**Responsibility: PAP to communicate with all program members, discuss, prioritize, and collate. All program members to report and discuss.**

## Career stage distribution implications and plans for the next 5 years

**Instructions**: Describe the implications of the current distribution of faculty across career stages (e.g., Assistant, Associate, Professor from Section 1) for the program currently and in the next 5 years. In particular, identify up-coming faculty retirements and/or recruitments and discuss and how the program plans to work with those changes to maintain the program’s core strengths as well as evolve in new directions.

**Motivation: Provide perspective on the current status and future changes in personnel in the program.**

|  |
| --- |
| In the next five year period two of the professors in the program will reach the age of 69; Prof. Oppeneer in the end of 2026 and Prof. Eriksson in 2029. The program strives for replacing these two positions, primarily via an external recruitment of one professor with a high scientific profile that is in line with the activities of the current ones, but that also can bring in new activities. This may be done in coordination with the excellence program of WISE (WISE-materials.org) and KAW, that have expressed a potential willingness in co-funding such an effort. Promotion of a current associate professor is also considered. Currently, there are 7 permanent researchers out of which 2 are quite senior. Most of them have managed to secure different types of grants including VR.  Given the success of younger persons in the program, we strive to offer a career ladder that can promote their scientific and educational efforts. |

## Reflections on the process for identifying recruitment needs and focusing areas

**Instructions**: Pick a specific faculty-level recruitment during the evaluation period reflect on how the process of identifying the need for recruitment and focusing the research area worked. First describe the recruitment, e.g., Assistant/Associate/Professor-level and research area. Then discuss how the program worked to identify the need for a recruitment in this area, including discussing how the need was identified, how was it discussed and revised in the program, who was involved in the discussions, etc. For focusing the research area, describe how the balance between continuing existing areas vs. choosing new ones was discussed, who was involved in the discussions, what criteria were discussed to ensure that this direction would strengthen the program, etc. If the program has not done any faculty recruitments during the evaluation period, please reflect on how they would be undertaken.

**Motivation: Explain how recruitments are currently motivated and decided**

|  |
| --- |
| Primarily it is the two professors that will reach 69 years of age that the program wishes to replace, primarily with one externally recruited person of a high caliber. This recruitment has the possibility to widen the scope of research areas within the program and make the program more competitive in the global scenario. The core research direction will remain unaffected to have a smooth transition. Successful current activities should be anchored in the program.  Alternatively, one can consider promotions of younger persons within the program to fill these positions.  In this and all other recruitments the program wishes to improve on the gender balance among the personnel. |

### Initiatives to recruit and retain top researchers/teachers

**Instructions**: Describe:

* How the program defines what a top researcher/teacher is and how that is used in recruiting (criteria, descriptions, search groups, subject representative, addressing younger recruits who have the potential to become top, etc.),
* How the program balances recruiting external talent vs. promoting internal staff, and who is involved in these discussions and decisions,
* How gender and career stage balance is considered in program planning and recruitment decisions, and,
* What the program does to identify and encourage strong external recruits to join.

**Motivation: Provide details as to what efforts are made to recruit and retain the best staff.**

|  |
| --- |
| According to general notion, a top researcher should be a highly accomplished person with significant contribution in the research field reflected in publications and citations, visibility in the global arena, acquiring top level external research grants regularly in both national and international levels and establishing successful scientific networks and collaborations. The last recruitment on a lecturer or professor level, that the program had from a person outside the Physics Department was 2004 when Prof. Oppeneer was recruited. It is time to step up in this process and intensify the search for excellent candidates on the international arena. |

## Career support

### Career support activities for non-tenure-track staff (beyond standard employee dialogs)

**Instructions**: Describe the activities for supporting non-tenure-track (PhDs, postdocs, researchers, adjuncts, etc.) staff in their careers and development. For example: financial support for personal development, mentoring, grant assistance, feedback, career planning, help with job searches, etc.. Explicitly address what support is provided for obtaining the docent and distinguished teacher qualifications for post-PhD staff. Specify if activities are informal (e.g., expected as part of advising/mentoring) or formal (e.g., part of a regular process).

**Motivation: Provide details as to how the program works with career development for non-tenured staff and encourage the program to reflect on whether it is providing the right type and amount of support.**

|  |
| --- |
| All non-tenure track personnel are encouraged to take steps that boosts their career, e.g. to apply for docentships and take training programs within the university to become a better teacher and supervisor. They are also encouraged to present their results in the higher regarded journals and to present scientific results at international conferences. In addition, they are encouraged, and get support in writing grants for third party funding, from agencies like VR, KAW, ERC, SSF, Carl Tryggers Foundation etc. Those that land such research contracts, also get help in the recruitment process of PhD students and postdocs. The program strives to accommodate co-funding of larger external grants, when needed. |

### Career support activities for tenure-track staff (beyond standard employee dialogs)

**Instructions**: Describe the activities for supporting tenure-track staff (Assistant Professors) in their careers and development. For example: financial support for personal development, startup packages, mentoring, grant assistance, feedback, career planning, co-advising, etc. Include discussions of support for promotion (Assistant to Associate) as well as docent and distinguished teacher qualifications. Specify if activities are informal (e.g., expected as part of advising/mentoring) or formal (e.g., part of a regular process). If there are very few staff in this category, please reflect on why that is and if that is something that should be addressed.

**Motivation: Provide details as to how the program works with career development for tenure-track staff and encourage the program to reflect on whether it is providing the right type and amount of support.**

|  |
| --- |
| All tenure track personnel are encouraged to take steps that boosts their career, e.g. to apply for docentships and take training programs within the university to become a better teacher, leader and supervisor. They are also encouraged to present their results in the higher regarded journals and to present scientific results at international conferences. In addition, they are encouraged, and get support in writing grants for third party funding, from agencies like VR, KAW, ERC, SSF, Carl Tryggers Foundation etc. Those that land such research contracts, also get help in the recruitment process of PhD students and postdocs. These persons are also encouraged to make applications, when appropriate, for promotion to the next step on their career ladder. |

### Career support activities for tenured staff (beyond standard employee dialogs)

**Instructions**: Describe the activities for supporting tenured staff (Associate Professors and Professors) in their careers and development. For example: financial support for personal development, mentoring, grant assistance, feedback, career planning. Include discussions of support for promotion (Associate to Professor) as well as docent and distinguished teacher qualifications. Specify if activities are informal (e.g., expected as part of advising/mentoring) or formal (e.g., part of a regular process).

**Motivation: Provide details as to how the program works with career development for tenured staff and encourage the program to reflect on whether it is providing the right type and amount of support.**

|  |
| --- |
| All tenured personnel are encouraged to take steps that boosts their career, e.g. to take training programs within the university to become a better teacher, supervisor and leader. They are also encouraged to present their results in the higher regarded journals and to present scientific results at international conferences. In addition, they are encouraged, and get support in writing grants for third party funding, from agencies like VR, KAW, ERC, SSF, Carl Tryggers Foundation etc. Those that land such research contracts, also get help in the recruitment process of PhD students and postdocs. These persons are also encouraged to make applications, when appropriate, for promotion to the next step on their career ladder. |

## Reflections on what is working well

**Instructions**: From the above, reflect on what is working well and should be continued over the next 5 years.

**Motivation: Require programs to identify where current activities are successful. This will provide the panel with insights into our own self-assessment.**

|  |
| --- |
| The program has grown with two recruited UL since the last KoF (before that there were two recruitments in 2018). All these recruitments have been announced and held in open competition. To support junior staff, there are existing initiatives to feedback loops/workshops for improving grant applications. The senior staff is also very active in using their professional networks for spreading information about open positions and relevant grants to non-tenured staff. Non-tenured staff is often deeply involved in larger applications (KAW projects, ERC grants etc.) headed by tenured PIs. Senior staff members are also encouraging and active in discussing teaching and highlighting its importance with the non-tenured staff. |

## Reflections on what needs to be improved

**Instructions**: From the above, reflect on what needs to be improved over the next 5 years. Please focus on areas that need improvement and do not list areas that could be improved but where it is not needed.

**Motivation: Require programs to identify where they feel that they need to invest. This will both provide the panels with insights into our own self-assessment as well as help us improve.**

|  |
| --- |
| With the large number of non-tenured staff members, the possibilities for tenured positions within the program is limited. To avoid misconceptions about career opportunities, internally and externally, both expectations and possibilities could be made clearer. This involves highlighting the need for pedagogical career development.  The discussion about research strategies, including the opening of future positions, within the program could be improved with an increased involvement of all tenured staff.  With the recent split of the research program, combined with personal career path changes, the program has lost two female professors which is very unfortunate from a gender balance point of view. There is a perceived lack of international interest for advertised tenured positions and having a larger pool of applicants to our open positions would be beneficial. |

# Area 3: Collaboration and Outreach (evaluation of processes)

**Responsibility: PAP to communicate with all program members, discuss, prioritize, and collate. All program members to report and discuss.**

Collaboration and outreach (“samverkan” in Swedish) should be interpreted to mean activities that reach outside of the university to non-academic partners. Specifically, academic collaborations with other research organizations within academia should be considered part of our research and not collaboration and outreach for this evaluation. To help with this section, here is a partial list of the types of collaboration and outreach that we are striving to achieve:

* Joint research projects, student/PhD/postdoc/researcher/faculty exchanges/sabbaticals, etc.
* Advising/consulting, spreading research results/insights, popular science outreach and publications, press interviews, expert panels, etc.
* Interactions with industry, government, schools, society, media, etc.
* Academic entrepreneurship, including creating, joining, and advising startups and companies, etc.
* Feedback of external ideas, challenges, relevant questions, etc., into program(s) or departments.

## Specific collaboration and outreach examples

**Instructions**: Provide up to three specific examples of collaboration and outreach activities connected to the program’s research. Under “Example and connection” describe the activity and person or organization with whom the collaboration or outreach took place. (e.g., “Expert advice on SUBJECT for COMPANY”, “Popular science book on SUBJECT aimed at AUDENICE”, or “Interview on PROGRAM about SUBJECT”.) Specify the value to the program (e.g., “exposure to new challenges and issues that COMPANY experience on a practical level” or “making the SUBJECT expertise of our researchers visible to the nation”) and the value to the partner (e.g., “insight into how COMPANY can model the physical properties from the chemical composition” or “addressing public concern over the impact of SUBJECT on the environment”). Keep in mind the broad range of collaboration and outreach listed above.

**Motivation: Provide a list of specific examples of collaboration and outreach activities to motivate the self-reflection below and to serve as a source of examples for others.**

|  |  |  |
| --- | --- | --- |
| **1** | **Example and connection** | “Circular Initiative 2022” organized by Stena Recycling (VIP invitation). Dr. H. Herper and Prof. O. Eriksson were invited to participate in the informal event in Stockholm. |
| **Value to the program** | Networking, identify the urgent research questions from the industry which relate to our research. Seek contacts with industrial partners for possible joint applications |
| **Value to the partner** | Gain insight into what academia can offer e.g. materials design. Identify possible collaborators from academia. |
| **2** | **Example and connection** | Dr. O. Grånäs has had an SSF strategic mobility grant for collaborating with ABB / Hitachi Power grids. “Materials modelling for transformers optimization” (2019-2020) |
| **Value to the program** | Networking, increased visibility of the program and inspiration for future research directions. Showcasing connections with industry. |
| **Value to the partner** | Access to expertise on first-principles modeling of materials. Direct connection with academia. |
| **3** | **Example and connection** | Every year high-school students and teachers visit Ångström Laboratory and make common experiments as well as visits the Foucault pendulum (house 10), led by Prof. Klintenberg. |
| **Value to the program** | Reaching out the young persons is always rewarding and important and connecting to educational efforts is crucial. |
| **Value to the partner** | The feedback from these visits is that the students feel inspired and motivated. |

### Reflections on overall aims and strategies for collaboration and outreach

**Instructions**: Use the above examples, as appropriate, to reflect on the program’s overall aims and strategies for collaboration and outreach and discuss what enabled the above examples (e.g., how were they first identified and initiated? How did they fit into the overall aims and strategies? Etc.) and what it takes to keep them functioning well (e.g., staff, networking, meetings, equipment/labs/supplies, etc.).

**Motivation: Understand what we need to create and maintain collaboration and outreach**

|  |
| --- |
| In the examples above the key ingredient was networking and personal interest. The collaboration with Sandvik Coromant was enabled by having alumni from the program employed at Sandvik. The Stena Recycling event came as an invitation and offered a new interesting opportunity to get to know the players outside academia in Sweden. Outreach happens mostly via personal contacts or invitations.  There is no centralized or coordinated effort for outreach within the program so to keep the collaborations running, mutual interest as well as available (financial) resources on a personal basis are needed. |

## Support for outreach and collaboration

**Instructions**: Describe the specific support resources and processes available to program members for outreach and collaboration towards non-academic actors, such as collegial discussions, meetings with external actors, etc. Describe whether the activities are formal or informal and whether they are managed by the research program, department, or faculty.

**Motivation: Understand what support the program has for outreach and collaboration.**

|  |
| --- |
| While outreach support is available on the faculty level, it is not something that is well known among the program members. Thus, most outreach activities are based on personal drive, involvement and already established networks. The program could be more visible and active in initiatives such as the AIMday Materials activity and in looking for more outreach related grants, such as the SSF grant mentioned in 5.1. |

## Reflections on what is working well

**Instructions**: From the above, reflect on what is working well and should be continued over the next 5 years.

**Motivation: Require programs to identify where current activities are successful. This will provide the panel with insights into our own self-assessment.**

|  |
| --- |
| Once a contact/network is established, there is a perceived interest from the industry. There is support from the department and the central administration for writing popular science press releases. The popular science seminar series “13x13” that is organized by the department provides a natural venue for outreach to the general public. All visits from school students are highly appreciated. |

## Reflections on what needs to be improved

**Instructions**: From the above, reflect on what needs to be improved over the next 5 years. Please focus on areas that need improvement and do not list areas that could be improved but where it is not needed.

**Motivation: Require programs to identify where they feel that they need to invest. This will both provide the panels with insights into our own self-assessment as well as help us improve.**

|  |
| --- |
| Since there are existing activities and support structures for outreach at the faculty level, the members of the program could be more active in utilizing these resources. Instead, it is perceived that we currently do not interact with them enough. There could be an increased collegial drive to encourage colleagues to be more active and visible with outreach activities. There could be improved support for increasing the visibility of press releases, not only on the university homepage but also actively targeting relevant news sources and journals. |

# Area 4: Connection between Research and Teaching (evaluation of processes)

**Responsibility: PAP to communicate with all program members and the director of studies, discuss, prioritize, and collate. All program members to report and discuss.**

The types of connections between research and teaching that we are striving to achieve include, but are not limited to:

* Activities that lead to a scientific approach and student progression in learning how to apply the scientific method within courses and throughout education programs
* Teachers who are active researchers take opportunities to develop their pedagogical skills
* Researchers who are active teachers and take opportunities to develop their pedagogical skills
* Students being trained to find, use, and evaluate research results
* Students being active in on-going research projects
* Integration of research results, methods, and facilities in teaching

## Main teaching areas

**Instructions**: List up to four teaching programs, course packages, or contract/continuing education that the research program’s members contribute to. Specify the level (e.g., bachelor’s or master’s), how much the members of the research program contribute to the teaching program based on the number of full courses taught and whether the teaching program is managed (e.g., the program coordinator/director is in the research program) by members of the research program (yes/no). For the number of courses taught, exact values are not needed. Instead estimate the teachers’ contribution in terms of full courses taught (e.g., 1.0 means the teacher taught the equivalent of one full course) and use the ranges of: <1, 1-5, >6 to simplify accounting.

**Motivation: To show what subjects the program primarily teaches in.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Teaching program, course package, or contract/continuing education** | **Level** | **Courses Taught** | **Managed** |
| Master materials | MSc/PhD | >6 | Yes |
| Civ Q | Civ. ing. | >6 | No |
| Civ ES | Civ. Ing. | >6 | No |
| Basår | Prep. | >6 | No |

## Infrastructure use in teaching

**Instructions**: Please list any major research infrastructures that are used in teaching, the courses that use it, the education level, and the approximate number of students who use it each year.

**Motivation: To understand what infrastructure is being used in teaching and to support the faculty’s ongoing work on developing an infrastructure policy**

|  |  |  |  |
| --- | --- | --- | --- |
| **Infrastructure** | **Courses** | **Level** | **Students** |
| UPPMAX | Hands on electronic structure calculations | MSc/PhD | < 10 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

## Specific teaching/research connections

**Instructions**: Provide up to four specific examples of how the program’s research has been incorporated into teaching activities or strengthened courses, and/or how teaching activities have been incorporated into the program’s research activities or strengthened the program’s research. Under “Example” describe the connection (e.g., “lab exercise using the facility X that exposes students to research technique Y”). Under “Course Info” specify the course name, program, level (introduction/advanced), and the approximate number of students taking it each year. Describe the value to the teaching experience from the research connection (or vice versa).

**Motivation: Provide a list of specific examples of teaching/research connections to motivate the self-reflection below and to serve as a source of examples for others.**

|  |  |  |
| --- | --- | --- |
| **1** | **Example** | Projects integrating current research topics where students compile a report and present to their peers. Materials modeling using jupyter notebooks for optical, thermal and electrical properties. |
| **Course Info** | Condensed Matter Physics 1FA526, introductory (last year bachelor), approx. 15 students |
| **Value to teaching/ research** | The class benefits from an expansive perspective on contemporary subjects, while each student acquires a deep and focused understanding of a singular topic. In this process, educators are exposed to a broader range of topics beyond their specialized areas. |
| **2** | **Example** | Project work on numerical methods relevant to research in materials theory. |
| **Course Info** | Beräkningsfysik 1FA573, advanced, approx. 35 [OG1] students |
| **Value to teaching/ research** | Students immerse themselves in projects that are closely connected to the methodologies employed within the research program. Educators, meanwhile, have the liberty to weave their preferred methods into the course curriculum. |
| **3** | **Example** | Radiation detection systems and materials and the connection to biomedical imaging and nuclear non-proliferation |
| **Course Info** | Several bio-medical imaging/technology/physics courses, introduction and advanced, ca. 100 |
| **Value to teaching/ research** | The research provides a rich pallet of examples of relevant research questions and results. Discussing why these questions and results are relevant enrich the material and inspire, motivate and engage the students. |
| **4** | **Example** | Radiation damage modeling research and how that connects to materials degradation challenges at nuclear power plants. |
| **Course Info** | Kemi, material och bränsle för LWR. KKI, 3:rd year, 5-25. |
| **Value to teaching/ research** | The course benefits from our research because of (i) real, relevant, up-to-date examples and enriched material (ii) increased motivation, inspiration and engagement (iii) bridges the gap between theory and applications |

### Reflections on overall aims and strategies for connections

**Instructions**: Use the above examples, as appropriate, to reflect on the program’s overall aims and strategies for teaching and research connections and discuss what enabled the above examples (e.g., How were they first identified and initiated? How did they fit into the overall aims and strategies? etc.) and what it takes to keep them functioning well (e.g., staff, networking, meetings, equipment/labs/supplies, etc.).

**Motivation: Understand what we need to create and maintain connections**

|  |
| --- |
| Our aim is to connect teachers with specific research topics to advanced bachelor, master and PhD level courses. In referencing our earlier examples, this initiative encourages teachers to leverage their expertise, ensuring a tailored and enriched education. This synergy not only broadens the academic horizon for the class but also meticulously aligns students' specialized interests with potential thesis projects under the guidance of instructors. To maintain research-teaching links we need a continued alignment of courses with faculty research and to some extent with industry trends/needs. We try to update curricula to reflect research connections when relevant. |

## Support for integrating teaching and research

**Instructions**: Describe the support resources and processes for integrating teaching and research available to program members such as collegial discussions, meetings with students, course reviews, teaching follow-up, etc. Describe whether the activities are formal or informal and whether they are managed by the research program, department, faculty, or teaching program. If there are no such resources or processes in the research program, then please reflect on whether that is something the research program or department should address under reflections below.

**Motivation: Explain what support there is for improving the research and teaching connection.**

|  |
| --- |
| We have access to the standard package of support resources and processes provided by the department, faculty and university. This includes, but is not limited to, discussions, teacher development conferences and courses, course reviews and of course collegial interactions. The latter is probably the most important factor since it is driven by interest and curiosity. A department level example is our weekly seminars, known as 'teacher lunches', serve as a forum for exploring topics of shared interest, including strategies for integrating research into teaching. A visit to large Swedish infrastructures, like MAX IV, NAISS and MyFab, would be helpful for our students. |

## Reflections on what is working well

**Instructions**: From the above, reflect on what is working well and should be continued over the next 5 years.

**Motivation: Require programs to identify where current activities are successful. This will provide the panel with insights into our own self-assessment.**

|  |
| --- |
| i) The division aims at aligning the faculty research with relevant teaching/courses whenever possible. This works well.  ii) Collegial interactions where teaching and teaching-research connections are discussed and work well. Our teachers actively collaborate by sharing resources and engaging in discussions. As pointed out above this probably is because such initiatives are driven by interest and curiosity (not because of regulations and/or administrative overhead).  iii) On the department level, the *teacher lunch* has good attendance and an active audience and should be continued. |

## Reflections on what needs to be improved

**Instructions**: From the above, reflect on what needs to be improved over the next 5 years. Please focus on areas that need improvement and do not list areas that could be improved but where it is not needed.

**Motivation: Require programs to identify where they feel that they need to invest. This will both provide the panels with insights into our own self-assessment as well as help us improve.**

|  |
| --- |
| Given the boundary conditions and what has been discussed above the teaching and teaching-research connection work well. At the division level we do not need to invest more but the faculty and university need to change priorities. Of highest importance is improved financial support for advanced courses. The connection between teaching and research is most clear in advanced courses, and is a natural entry point to research topics for our students. As a large research university it is natural that we have a wide selection of courses on a higher level. Currently we give little to no financial support for specialized, advanced courses. The undergraduate courses are actually also under-financed. More time to the teachers will improve the quality in all respects, teaching-research connections included. A considerable part of the overhead should be redirected from administration towards teaching. The information flow and relevant decisions of the director of studies (studierektor) need to be improved to ensure good conditions for high-level teaching. |

# 5-year Priorities

**Instructions**: Identify, describe, and motivate specific Priorities that have a high likelihood of meaningfully strengthening or meaningfully broadening research over the next 5 years. The Priorities should be well-motivated and have sufficiently developed plans that it is clear what needs to be done to accomplish them and how to evaluate if they are successful. The Priorities can cover a wide range of activities with the overall goal of strengthen research, and do not need to require additional expenses. These can include, but are not limited to:

* Strengthening existing areas (e.g., to adapt to future challenges in the field or are necessary to maintain high quality, including by investing in new equipment, facilities, or staff, etc.)
* Investing in new areas (e.g., to adapt to changes in the field or new developments, by including investing in new equipment, facilities, or staff, etc.)
* Changing research organization by splitting, merging, closing, or moving research programs/departments (e.g., to improve collaboration or use of facilities or resources, etc.)
* Changing research policies (e.g., to address funding/co-funding, multi-disciplinary work, or recruiting, etc.)
* Changing research support (e.g., to improve grant success rates, recruiting, management, adoption of new techniques/technologies, etc.)

Building upon existing strategic plans is encouraged and co-funding/support from the program or department is expected to demonstrate commitment to the plan. There will be a yearly lightweight follow up process to see what progress has been made for each Priority with an opportunity to revise/change them as needed. The goals are to both ensure that we follow up on our stated Priorities and that we always have clear Priorities at each level in the faculty.

Each program is allowed to propose 3 Priorities: one that can be fully accomplished within the program, one that may require support at the department level, and one that may require support at the faculty level. This done to ensure that all programs will have at least one Priority they can work on as the very limited faculty funding available means only a few programs will receive additional resources.

Prioritization at the department level: Each department will review the Priorities from all of its programs and consider which to include in the department’s own list of Priorities, along with department’s own Priorities.

**Motivation: Identifying Priorities encourages strategic analysis and medium-term planning within the program, and makes it easier for the department and panel to understand the programs’ own assessments of their needs and opportunities. Requiring two of the Priorities to be able to be accomplished within the program and the department emphasizes the need to work locally as well as at the faculty level.**

**Responsibility: PAP in discussion with program members.**

Theory for materials science, on all levels, is a highly rewarding activity that is important for the scientific development of many fields, and in particular is important for the use of larger Swedish infrastructures such as ESS, MAX IV and Tandem lab. This activity is also crucial in finding sustainable technology solutions, which are vital to stop the deterioration of the Earth’s living conditions for all its inhabitants.

For this reason, it is vital that renewal within the program will take place during the next five years, given that two of the professors (that both recently landed KAW Scholar projects) will pass the age of 69. This hopefully involves recruitment on the international arena, and may require extra FFF funding in order to recruit among the very best scientists.

# Priority 1 of 3: An activity that can be accomplished within the program

## Description of the Priority

**Instructions**: Provide the department name (since these will be collected at the section/faculty level) and the program name (if this is a program Priority), the title of the Priority, and whether it may require department support (Yes/No) and/or faculty support (Yes/No).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Department:** | Physics and Astronomy | | | |
| **Program:** | Materials Theory | | | |
| **Title:** | Securing excellence in light of retirements | | | |
| **Support:** | **May require department support:** | [Yes] | **May require faculty support:** | [Yes] |

### Goal

**Instructions**: Specify the goal of the Priority, for example, to strengthen a specific existing activity or start a new one.

|  |
| --- |
| The goal is to ensure that momentum is not lost in the program’s activity, when two of the senior professors retire. |

### Expected meaningful research improvement

**Instructions**: Provide a description of the research that investing in this Priority will accomplish over the next 5 years. Explain how it has the potential to significantly strengthen or broaden the program for program proposals or department for department proposals. Specifically, this should go beyond continuing or slightly enlarging current activities by having a clear description of what change it will accomplish.

**Motivation: The overall goal is to strengthen our research. As a result, the Priority should deliver meaningful improvements in research quality and/or breadth.**

|  |
| --- |
| Recruiting person(s) that can carry on and lead and to renew the activities within the program in the years to come is high priority, and may require recruitment on an international arena. This will most likely require additional funding within the program, department and the faculty. |

### Implementation plan

**Instructions**: Provide a brief description of specifically what is planned to be done over the next 5 years to realize the potential of this Priority. For example: new hires, investments in equipment, starting collaborations, closing down existing activities, moving resources from existing activities, etc. Use the limited space provided here to discuss the most important aspects of how this activity will be carried out.

**Motivation: For a Priority to be credible, there must be a plausible plan and what needs to be accomplished must have been thought through. It is understood that these plans will change over the next 5 years, however.**

|  |
| --- |
| A recruitment strategy has to be established by the Department and the Faculty to carry out this task. It is desired that in this transition, the excellent current activities become enhanced and renewed. |

### What previous accomplishments indicate a high likelihood of success?

**Instructions**: Describe what recent (last 5 years) accomplishments make it clear that the there is a good chance of success in this project. Use specific examples (e.g., grant X, collaboration Y, paper Z) and explain how those recent accomplishments are evidence of having the competencies needed to be successful in this project.

**Motivation: For a Priority to be credible, the expertise and track record needed to support it must be present.**

|  |
| --- |
| The program is one of the most successful activities in the university, by any measure and metric, and it is important that high-profile successors will be found. |

## Current status of the area at Uppsala University

Instruction: Describe the current status of the area at Uppsala University as a whole. Include any existing funding, support, staff, and success in this area. Explicitly identify any overlap with other existing activities at the program(s), department, section, faculty, and/or university levels.

**Motivation: To avoid duplicating efforts, it is important to understand the local Uppsala context when enhancing existing activities or starting new efforts. As part of the evaluation process, the panel will try to identify synergies between proposed Priorities.**

|  |
| --- |
| Not Applicable |

### Current and planned contributions to support the initiative

**Instructions**: Describe the current (already in-place and on-going) and planned contributions to this goal from the local level (from the program for program proposals, from the department for department proposals, and from both the program(s) and department, as appropriate, for program proposals selected by the department). For example, co-funding, in-kind support, shared funding of facilities, transfers of FFFs, etc.

**Motivation: Evidence of financial commitment from the local environment strongly supports the proposal as being important. Conversely, if the local environment is unable or unwilling to support it, the importance to the environment as a whole is much weaker.**

|  |
| --- |
| We will initiate a dialogue with the department and the faculty to secure that competence is not lost in the retirement process. |

## Strategic value

### Strategic value of the area in the global context

Instruction: Describe the importance of the area in the global context. For example: fundamental challenges in research; new developments in research; societal challenges and priorities; global impact and importance.

**Motivation: To ensure consideration of the larger context.**

|  |
| --- |
| See text under sections 8.1. |

### Strategic value of the area at the next level

Instruction: Describe the importance of the area to the department (for program proposals) and for the section and faculty (for department proposals). For example: synergies with other activities, connections to teaching and collaboration, both currently and potential for new ones, etc. Explain the value of this activity beyond any overlapping ones identified above.

**Motivation: To ensure that there is awareness of where this activity fits in at the next level up in the organization. This is particularly important if support is to be requested at that level.**

|  |
| --- |
| See text under sections 8.1. |

## Contributions needed for success

**Instructions**: Identify what contributions are needed for success in terms of time, expertise, resources, facilities, staff, etc. Explicitly include estimates of financial resources needed and where they will come from.

**Motivation: To ensure the costs and resources required have been thought through, and that they are reasonable given the scope of the benefit.**

|  |
| --- |
| See text under sections 8.1. |

### Success indicators

**Instructions**: Describe specific results that will indicate success in 5 years. For example: increases in publications in top venues X and Y, publications in new field Z, strengthened or new collaborations with university A, new hires in B, new grants from C, etc.

**Motivation: To ensure that the local- and faculty-levels will be able to assess whether this Priority was successful at the next evaluation so that we develop a positive cycle of following up on our strategic planning.**

|  |
| --- |
| See text under sections 8.1. |

### First steps that can be taken today

**Instructions**: Describe the first concrete steps needed to move in this direction that can be taken today. These should be clear enough that they can be followed up on in a year to see what progress has been made. Identify initial activities that can be started locally to enable progress to help motivate further support for the larger goal. In the exceptional case where no steps can be taken today, explain why a Priority has been chosen that cannot be started.

**Motivation: To ensure that there is a clear idea of how to get started and enable easy follow-up of how the Priority is progressing.**

|  |
| --- |
| A recruitment plan should be taken by the department and the faculty immediately. |

# Priority 2 of 3: An activity that may require department support

## Description of the Priority

**Instructions**: Provide the department name (since these will be collected at the section/faculty level) and the program name (if this is a program Priority), the title of the Priority, and whether it may require department support (Yes/No) and/or faculty support (Yes/No).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Department: | Physics and Astronomy (IFA) | | | |
| Program: | Materials Theory, Quantum Matter Theory, and Theoretical Physics (all three programs) | | | |
| Title: | More uniform research salary support for faculty members | | | |
| Support: | May require department support: | Yes | May require faculty support: | No (yes) |

### Goal

**Instructions**: Specify the goal of the Priority, for example, to strengthen a specific existing activity or start a new one.

|  |
| --- |
| Strengthen existing research by providing more stable support for research for all faculty members in dept. |

### Expected meaningful research improvement

**Instructions**: Provide a description of the research that investing in this Priority will accomplish over the next 5 years. Explain how it has the potential to significantly strengthen or broaden the program for program proposals or department for department proposals. Specifically, this should go beyond continuing or slightly enlarging current activities by having a clear description of what change it will accomplish.

Motivation: The overall goal is to strengthen our research. As a result, the Priority should deliver meaningful improvements in research quality and/or breadth.

|  |
| --- |
| The amount of faculty funding (for research) available for faculty members at the department is currently entirely dependent on which program one is based in and unfortunately vary hugely within the department, due primarily to historic reasons easily stretching back 20+ years. In fact, faculty members in many new and/or successful programs need to cover a very large part of their own salaries on external grants or teach the equivalent of a full-time teaching position, while in other programs, Profs and ULs have much more internal research support. This is not just unfair work conditions, but also, importantly, prevent us from recruiting and retaining the most talented researchers and hampers developments of new strong research fields. A stronger, more attractive, and more agile physics department would be possible if the internal research support for faculty was distributed more uniformly over the department. With recruiting and retaining the best researchers being the key for future successful research, providing stable and sufficient internal support for research for faculty members should be a main goal of the whole department. |

### Implementation plan

**Instructions**: Provide a brief description of specifically what is planned to be done over the next 5 years to realize the potential of this Priority. For example: new hires, investments in equipment, starting collaborations, closing down existing activities, moving resources from existing activities, etc. Use the limited space provided here to discuss the most important aspects of how this activity will be carried out.

Motivation: For a Priority to be credible, there must be a plausible plan and what needs to be accomplished must have been thought through. It is understood that these plans will change over the next 5 years, however.

|  |
| --- |
| The first step is to recognize the differences and determine the level of research salary support a faculty member should be allowed to have in his/her position. A realistic aim could be 60% FFF support for each tenured employee, which leaves a possibility for 40% of salary from teaching or other paid university service commitments, if external funding is not available. (It is here important to note that teaching is currently underfunded, such that 40% salary on the teaching budget corresponds to much more than a 40% time commitment). The exact numbers should be worked out based on the department’s allocation of both internal long-term research (FFFs) and its teaching budget. Implementation will be difficult, but transitioning over a longer period with possible short-term support for those activities most affected should still make it feasible. A more stable and uniform distribution of research salary support will also help to focus the department’s future recruitments to commonly identify needs and opportunities instead of the current process, which is fractured into each individual program. |

### What previous accomplishments indicate a high likelihood of success?

**Instructions**: Describe what recent (last 5 years) accomplishments make it clear that the there is a good chance of success in this project. Use specific examples (e.g., grant X, collaboration Y, paper Z) and explain how those recent accomplishments are evidence of having the competencies needed to be successful in this project.

Motivation: For a Priority to be credible, the expertise and track record needed to support it must be present.

|  |
| --- |
| Many programs at the department manage to support their faculty on internal resources at a substantially higher level than all three programs in the Theory Unit (MT, QMT, TP). Still, most of our current faculty members did not arrive recently (e.g. the last faculty hired, that now is employed in the QMT program, was in 2013), so the lack of internal research support for faculty members is not a new issue, but has plagued us for many years. By recently forming units within the department, which groups several programs together, we have been able to identify common issues such as this. Continuing to work for a more uniform department, and hence stronger department, is the goal of this priority. |

## Current status of the area at Uppsala University

Instruction: Describe the current status of the area at Uppsala University as a whole. Include any existing funding, support, staff, and success in this area. Explicitly identify any overlap with other existing activities at the program(s), department, section, faculty, and/or university levels.

Motivation: To avoid duplicating efforts, it is important to understand the local Uppsala context when enhancing existing activities or starting new efforts. As part of the evaluation process, the panel will try to identify synergies between proposed Priorities.

|  |
| --- |
| Different internal funding is natural in different programs due to the varied nature of the research. But all programs have faculty salaries to cover and doing so at widely different levels is not good for the department; it hampers recruitment and retainment and creates overall unfair work conditions. |

### Current and planned contributions to support the initiative

**Instructions**: Describe the current (already in-place and on-going) and planned contributions to this goal from the local level (from the program for program proposals, from the department for department proposals, and from both the program(s) and department, as appropriate, for program proposals selected by the department). For example, co-funding, in-kind support, shared funding of facilities, transfers of FFFs, etc.

Motivation: Evidence of financial commitment from the local environment strongly supports the proposal as being important. Conversely, if the local environment is unable or unwilling to support it, the importance to the environment as a whole is much weaker.

|  |
| --- |
| The department should be able to settle on a common funding structure for its faculty based on its existing allocation of internal resources. |

## Strategic value

### Strategic value of the area in the global context

Instruction: Describe the importance of the area in the global context. For example: fundamental challenges in research; new developments in research; societal challenges and priorities; global impact and importance.

Motivation: To ensure consideration of the larger context.

|  |
| --- |
| Attractive conditions for faculty members are key for future success on an increasingly global talent market. This concerns both being successful in future recruitments and retaining our best researchers. It is also very important for the cohesiveness of the department to provide uniform and fair work conditions. |

### Strategic value of the area at the next level

Instruction: Describe the importance of the area to the department (for program proposals) and for the section and faculty (for department proposals). For example: synergies with other activities, connections to teaching and collaboration, both currently and potential for new ones, etc. Explain the value of this activity beyond any overlapping ones identified above.

Motivation: To ensure that there is awareness of where this activity fits in at the next level up in the organization. This is particularly important if support is to be requested at that level.

|  |
| --- |
| A more uniform treatment of the faculty in the department will help with future recruitment and retaining of talent, which will overall increase the impact of the department’s research and thus of all physics and astronomy research at UU. |

## Contributions needed for success

**Instructions**: Identify what contributions are needed for success in terms of time, expertise, resources, facilities, staff, etc. Explicitly include estimates of financial resources needed and where they will come from.

Motivation: To ensure the costs and resources required have been thought through, and that they are reasonable given the scope of the benefit.

|  |
| --- |
| A willingness throughout the department to work for the common good to reduce the fractured current system. Short term extra resources might be needed from TekNat to facilitate a smooth transition. |

### Success indicators

**Instructions**: Describe specific results that will indicate success in 5 years. For example: increases in publications in top venues X and Y, publications in new field Z, strengthened or new collaborations with university A, new hires in B, new grants from C, etc.

Motivation: To ensure that the local- and faculty-levels will be able to assess whether this Priority was successful at the next evaluation so that we develop a positive cycle of following up on our strategic planning.

|  |
| --- |
| A more uniform distribution of internal research support for all of the department’s faculty members. Better ability to recruit and encourage faculty members to excel in top-notch research areas, which are competitive on the global arena. |

### First steps that can be taken today

**Instructions**: Describe the first concrete steps needed to move in this direction that can be taken today. These should be clear enough that they can be followed up on in a year to see what progress has been made. Identify initial activities that can be started locally to enable progress to help motivate further support for the larger goal. In the exceptional case where no steps can be taken today, explain why a Priority has been chosen that cannot be started.

Motivation: To ensure that there is a clear idea of how to get started and enable easy follow-up of how the Priority is progressing.

|  |
| --- |
| Determining the level of uniform faculty research that would be possible and then analyzing the changes needed within the department, identifying the best way to administratively handle the new arrangement, possibly with the department centrally paying salaries, and finding a way of handling this transition. |

# Priority 3 of 3: An activity that may require faculty support

## Description of the Priority

**Instructions**: Provide the department name (since these will be collected at the section/faculty level) and the program name (if this is a program Priority), the title of the Priority, and whether it may require department support (Yes/No) and/or faculty support (Yes/No).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Department:** | Physics and Astronomy | | | |
| **Program:** | Materials Theory | | | |
| **Title:** | Securing excellence in light of retirements | | | |
| **Support:** | **May require department support:** | [Yes/No] | **May require faculty support:** | [Yes/No] |

### Goal

**Instructions**: Specify the goal of the Priority, for example, to strengthen a specific existing activity or start a new one.

|  |
| --- |
| **The items and answers to be answered under section 10 overlap entirely with this of section 8 and are not repeated here for brevity.** |

### Expected meaningful research improvement

**Instructions**: Provide a description of the research that investing in this Priority will accomplish over the next 5 years. Explain how it has the potential to significantly strengthen or broaden the program for program proposals or department for department proposals. Specifically, this should go beyond continuing or slightly enlarging current activities by having a clear description of what change it will accomplish.

**Motivation: The overall goal is to strengthen our research. As a result, the Priority should deliver meaningful improvements in research quality and/or breadth.**

|  |
| --- |
|  |

### Implementation plan

**Instructions**: Provide a brief description of specifically what is planned to be done over the next 5 years to realize the potential of this Priority. For example: new hires, investments in equipment, starting collaborations, closing down existing activities, moving resources from existing activities, etc. Use the limited space provided here to discuss the most important aspects of how this activity will be carried out.

**Motivation: For a Priority to be credible, there must be a plausible plan and what needs to be accomplished must have been thought through. It is understood that these plans will change over the next 5 years, however.**

|  |
| --- |
|  |

### What previous accomplishments indicate a high likelihood of success?

**Instructions**: Describe what recent (last 5 years) accomplishments make it clear that the there is a good chance of success in this project. Use specific examples (e.g., grant X, collaboration Y, paper Z) and explain how those recent accomplishments are evidence of having the competencies needed to be successful in this project.

**Motivation: For a Priority to be credible, the expertise and track record needed to support it must be present.**

|  |
| --- |
|  |

## Current status of the area at Uppsala University

**Instruction**: Describe the current status of the area at Uppsala University as a whole. Include any existing funding, support, staff, and success in this area. Explicitly identify any overlap with other existing activities at the program(s), department, section, faculty, and/or university levels.

**Motivation: To avoid duplicating efforts, it is important to understand the local Uppsala context when enhancing existing activities or starting new efforts. As part of the evaluation process, the panel will try to identify synergies between proposed Priorities.**

|  |
| --- |
|  |

### Current and planned contributions to support the initiative

**Instructions**: Describe the current (already in-place and on-going) and planned contributions to this goal from the local level (from the program for program proposals, from the department for department proposals, and from both the program(s) and department, as appropriate, for program proposals selected by the department). For example, co-funding, in-kind support, shared funding of facilities, transfers of FFFs, etc.

**Motivation: Evidence of financial commitment from the local environment strongly supports the proposal as being important. Conversely, if the local environment is unable or unwilling to support it, the importance to the environment as a whole is much weaker.**

|  |
| --- |
|  |

## Strategic value

### Strategic value of the area in the global context

**Instruction**: Describe the importance of the area in the global context. For example: fundamental challenges in research; new developments in research; societal challenges and priorities; global impact and importance.

**Motivation: To ensure consideration of the larger context.**

|  |
| --- |
|  |

### Strategic value of the area at the next level

**Instruction**: Describe the importance of the area to the department (for program proposals) and for the section and faculty (for department proposals). For example: synergies with other activities, connections to teaching and collaboration, both currently and potential for new ones, etc. Explain the value of this activity beyond any overlapping ones identified above.

**Motivation: To ensure that there is awareness of where this activity fits in at the next level up in the organization. This is particularly important if support is to be requested at that level.**

|  |
| --- |
|  |

## Contributions needed for success

**Instructions**: Identify what contributions are needed for success in terms of time, expertise, resources, facilities, staff, etc. Explicitly include estimates of financial resources needed and where they will come from.

**Motivation: To ensure the costs and resources required have been thought through, and that they are reasonable given the scope of the benefit.**

|  |
| --- |
|  |

### Success indicators

**Instructions**: Describe specific results that will indicate success in 5 years. For example: increases in publications in top venues X and Y, publications in new field Z, strengthened or new collaborations with university A, new hires in B, new grants from C, etc.

**Motivation: To ensure that the local- and faculty-levels will be able to assess whether this Priority was successful at the next evaluation so that we develop a positive cycle of following up on our strategic planning.**

|  |
| --- |
|  |

### First steps that can be taken today

**Instructions**: Describe the first concrete steps needed to move in this direction that can be taken today. These should be clear enough that they can be followed up on in a year to see what progress has been made. Identify initial activities that can be started locally to enable progress to help motivate further support for the larger goal. In the exceptional case where no steps can be taken today, explain why a Priority has been chosen that cannot be started.

**Motivation: To ensure that there is a clear idea of how to get started and enable easy follow-up of how the Priority is progressing.**

|  |
| --- |
|  |

# Questions to the panel

The panel will provide feedback on research quality, strengths and opportunities for improvement, and comment and give feedback on staffing, funding, and at least one priority area.

**Instructions**: If you have specific questions for the panel that are not covered by those areas, please list up to three of them here. Please note that due to time constraints during the visit, not all questions may be answered.

|  |
| --- |
| (approximately 600 characters)  Question 1:  Question 2:  Question 3: |