

Theoretical Astrophysics

Staff (2024):

- Program professor (PAP): Paul Barklem
- Faculty members: Susanne Höfner (Future: Thomas Nordlander WAF)
- Ph.D. students: 4 (present: Arief Ahmad)
- Postdocs: 2 (present: Marília Carlos)
- Researchers (permanent): 5 (present: Bernd Freytag)

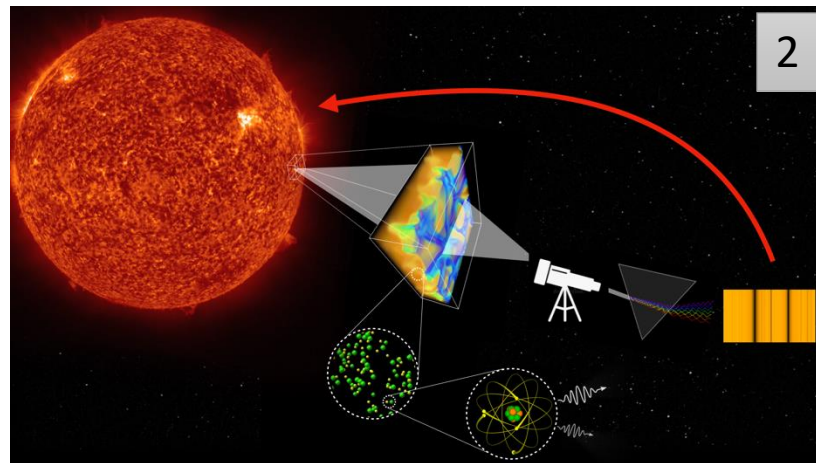
Part of Division of Astronomy and Space Physics



Research focus

Application of theoretical and computational methods to understanding of astronomical objects and their physics.
Build models and simulations, generate predictions, and produce synthetic observables, *from first principles*.

Main Research Areas		% of program	FTE Faculty	Type
1	Studies of evolved stars and their winds	55%	1	Basic
2	Atomic astrophysics and spectroscopy	35%	1	Basic
3	Galaxy – Dark matter connection	10%	0	Basic



Key enablers for research

- People
- Collaborations; theory, observations, experiments, databases
 - E.g. Observational program, ESO esp. 4MOST, Chalmers incl. Onsala, Stockholm incl. DESIREE, Lund-Malmö
- Computing
 - Supercomputing through NAISS + Local computing
- External funding; helps towards critical mass
 - During period: ERC-AdG, KAW project, 7xVR, 1xSNSB
 - Coming: KAW scholar and fellow
 - Cofunding a potential problem



Program priorities

(KoF24 report summary, Chapters 8-10)

Prio 1 (program): Exploring possible synergies in Multi-Messenger Astrophysics

Stimulate activity on multi-messenger astrophysics

Prio 2 (department): AI4Physics (*departmental priority*)

Strengthen all physics research through increased AI literacy, method development, and applications.

Prio 3 (faculty): Strengthening Stellar Astrophysics

Strengthening activity in stellar astrophysics to secure future leadership in the field

