SPECTROSCOPY OF LOW-LYING STATES IN NEUTRON-DEFICIENT ASTATINE AND FRANCIUM NUCLEI

Ulrika Jakobsson
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Ångströmlaboratoriet, Uppsala universitet

MOTIVATION

- Study of intruder structures observed in the lead region.
- How far above the shell closure can we observe these structures?
- What is the systematic behavior of these structures as a function of neutron number in astatine and francium isotopes?

Intruder states are generated through particle-hole excitations accross the Z=82 proton shell closure.

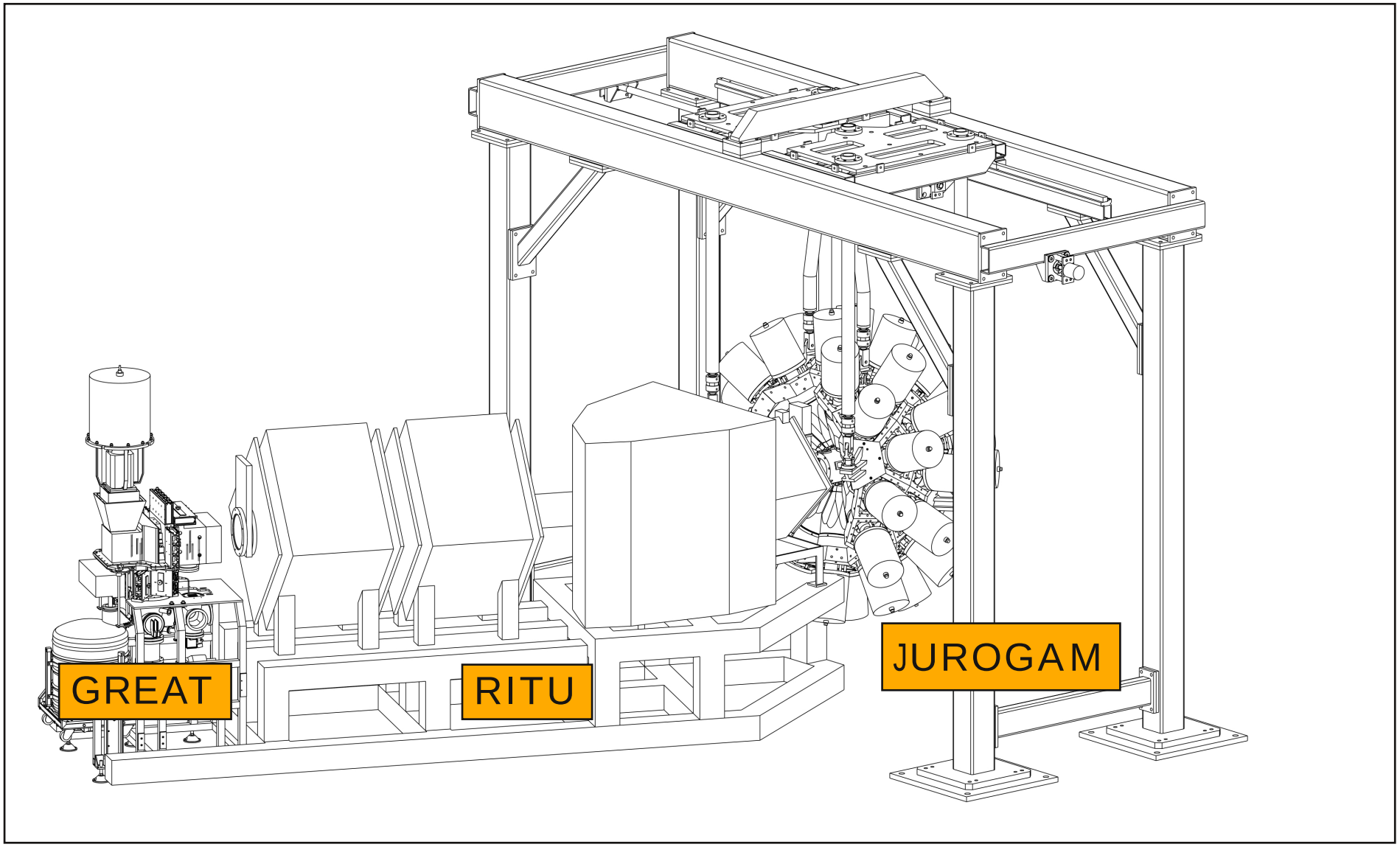
States associated with intruder structures in astatine and francium nuclei:

$1/2^+$ $(s_{1/2})^{-1}$ intruder excitation

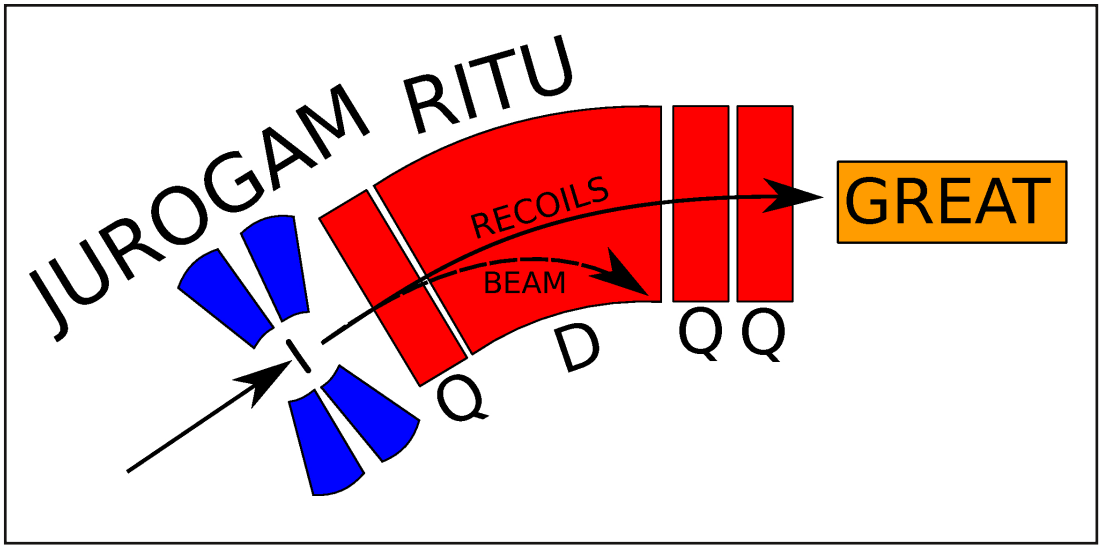
$13/2^+$ $(i_{13/2})$ couples to intruder excitation

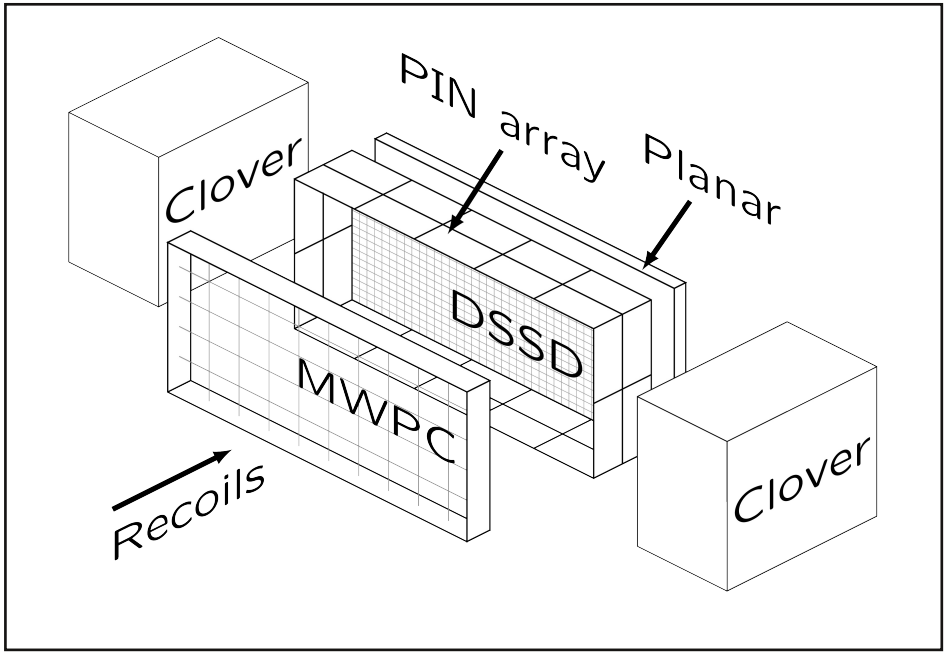
$9/2^-$ $(h_{9/2})$ stays spherical?

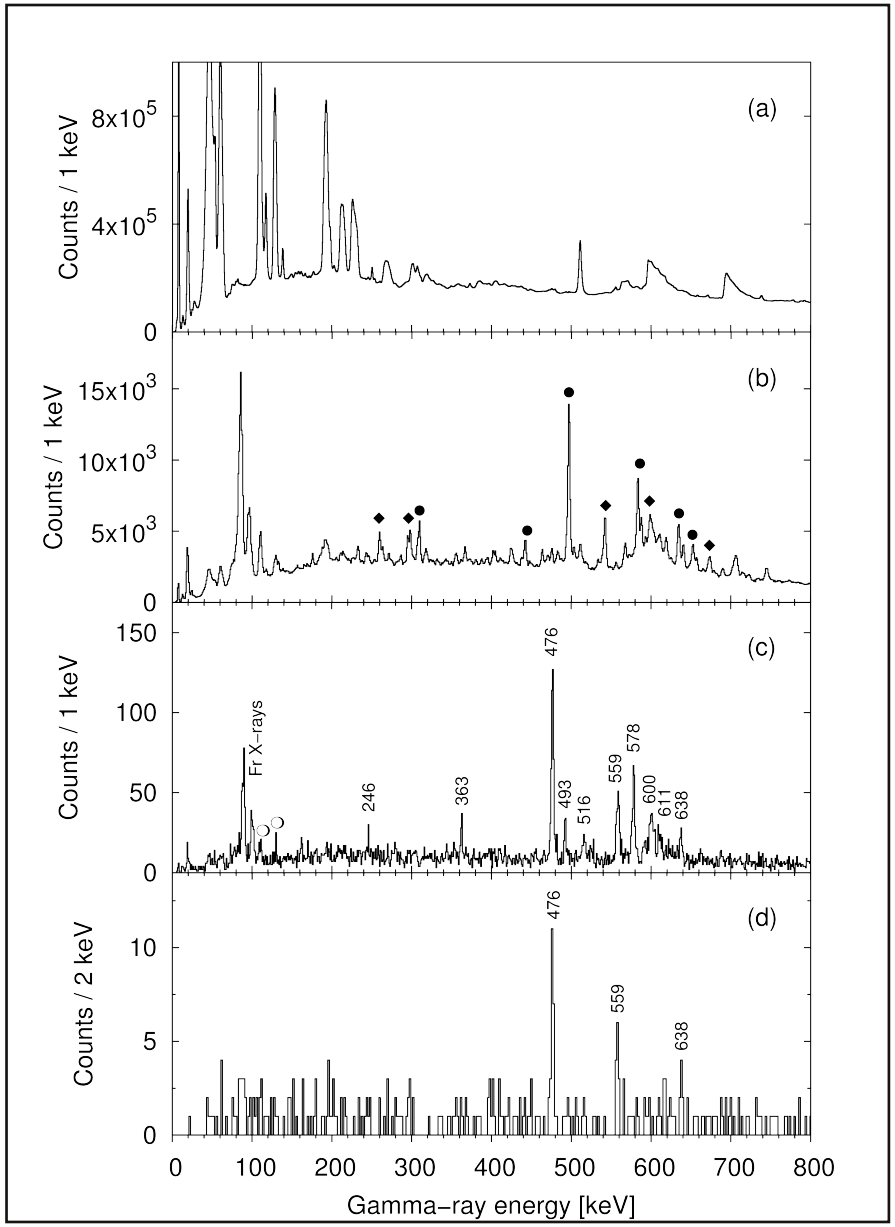
EXPERIMENTAL TECHNIQUES



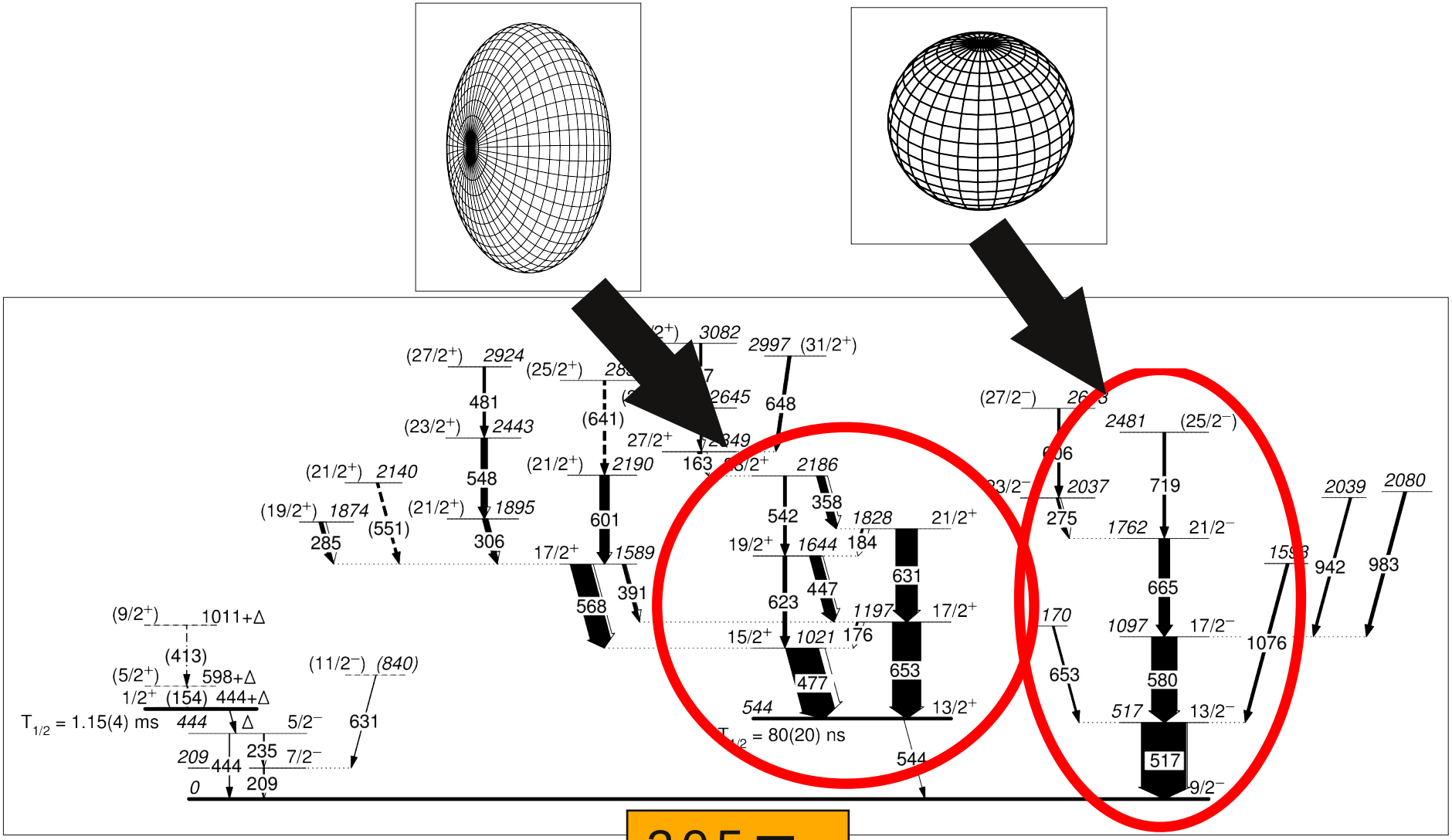
RECOIL DECAY TAGGING





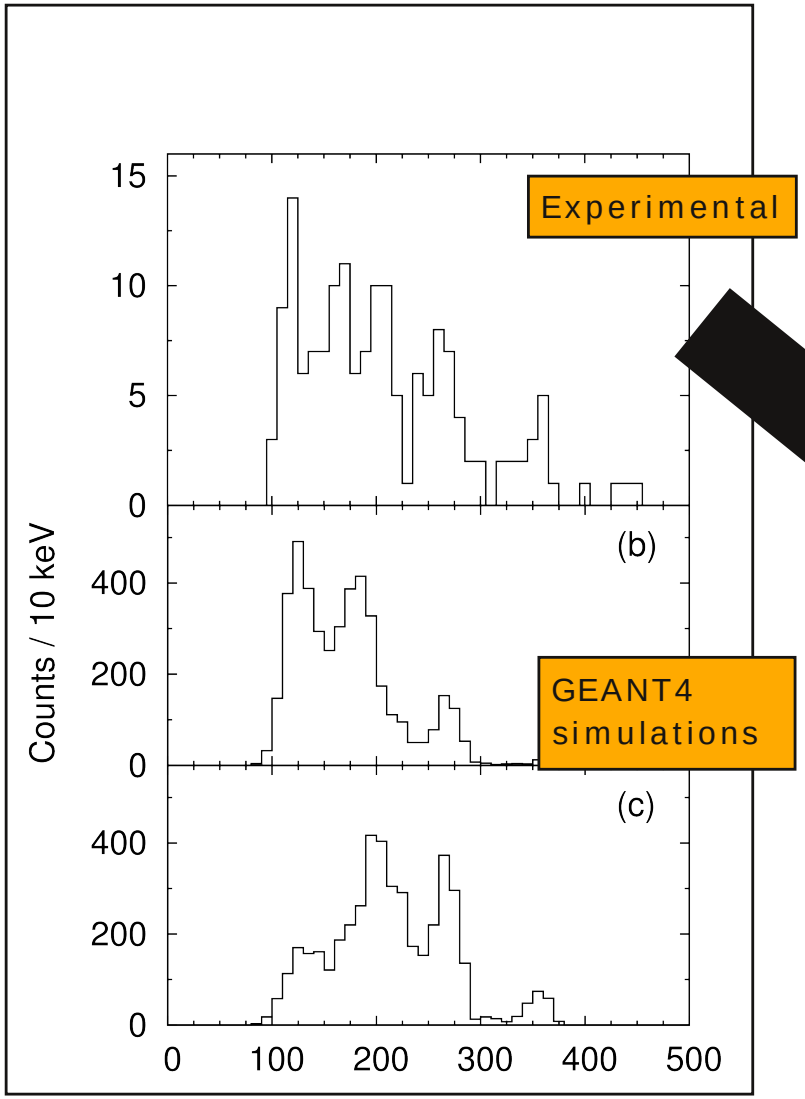


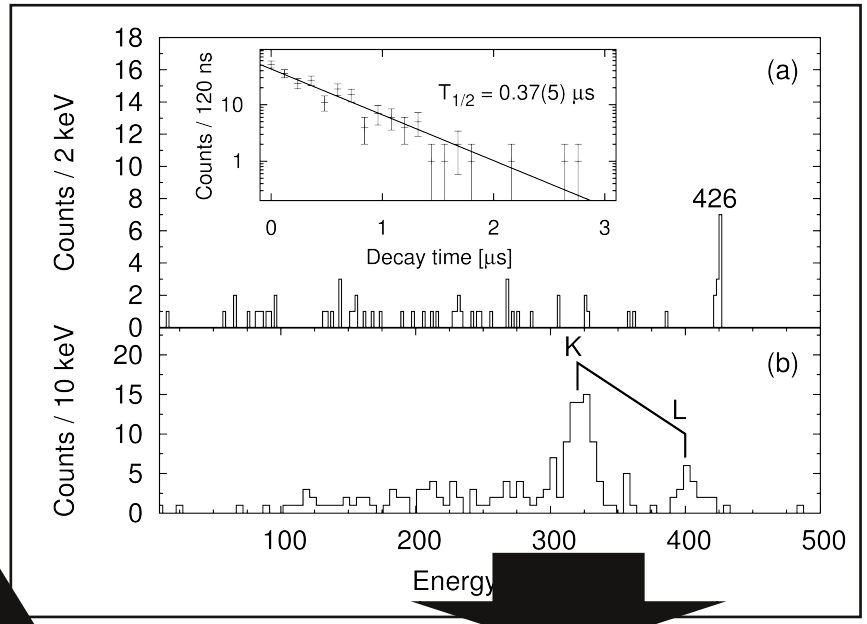
SHAPE COEXISTENCE IN THE CASE OF ^{205}Fr

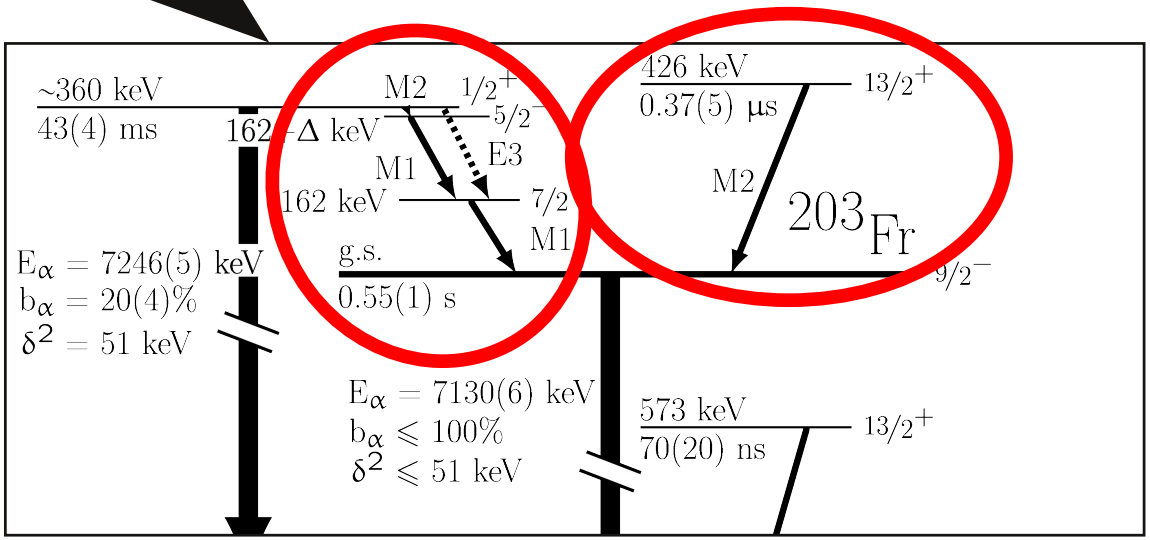


^{205}Fr

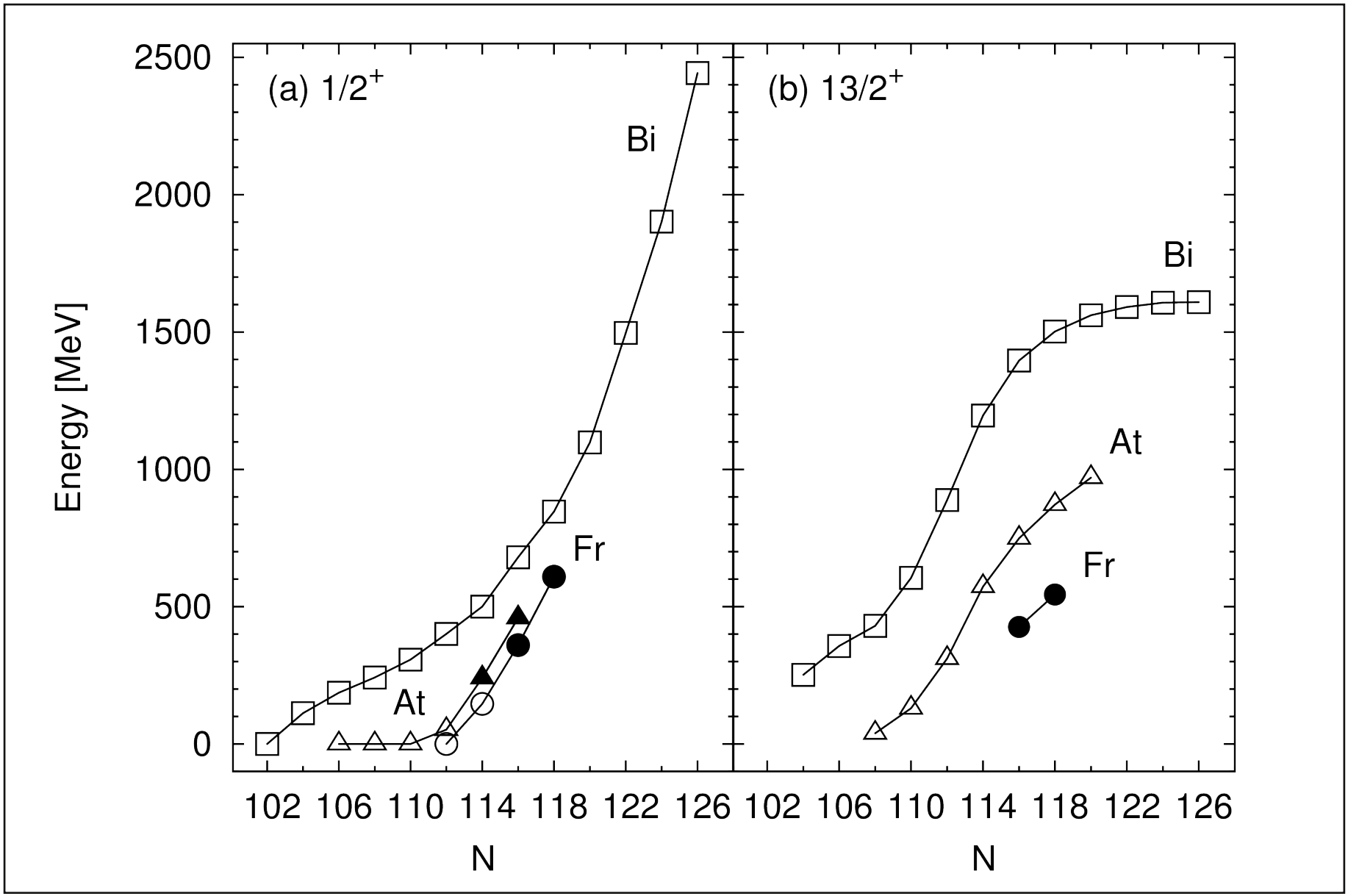
RDT IN THE GREAT SPECTROMETER - ISOMERS IN ^{203}Fr



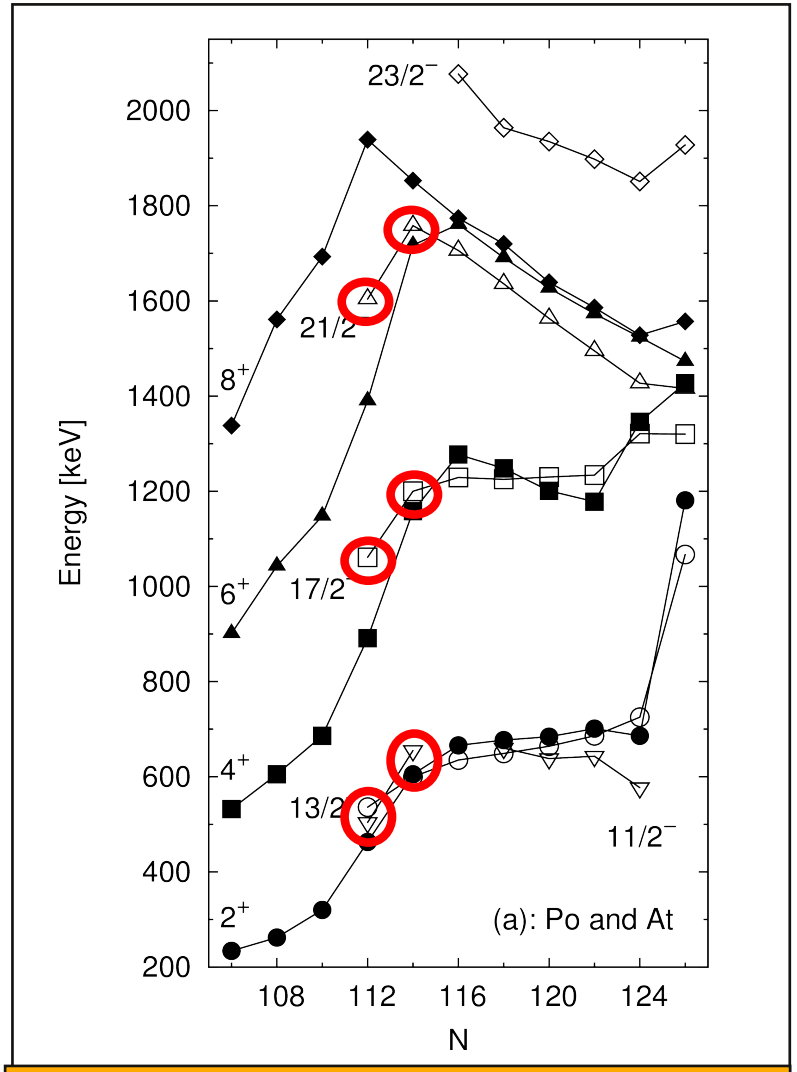




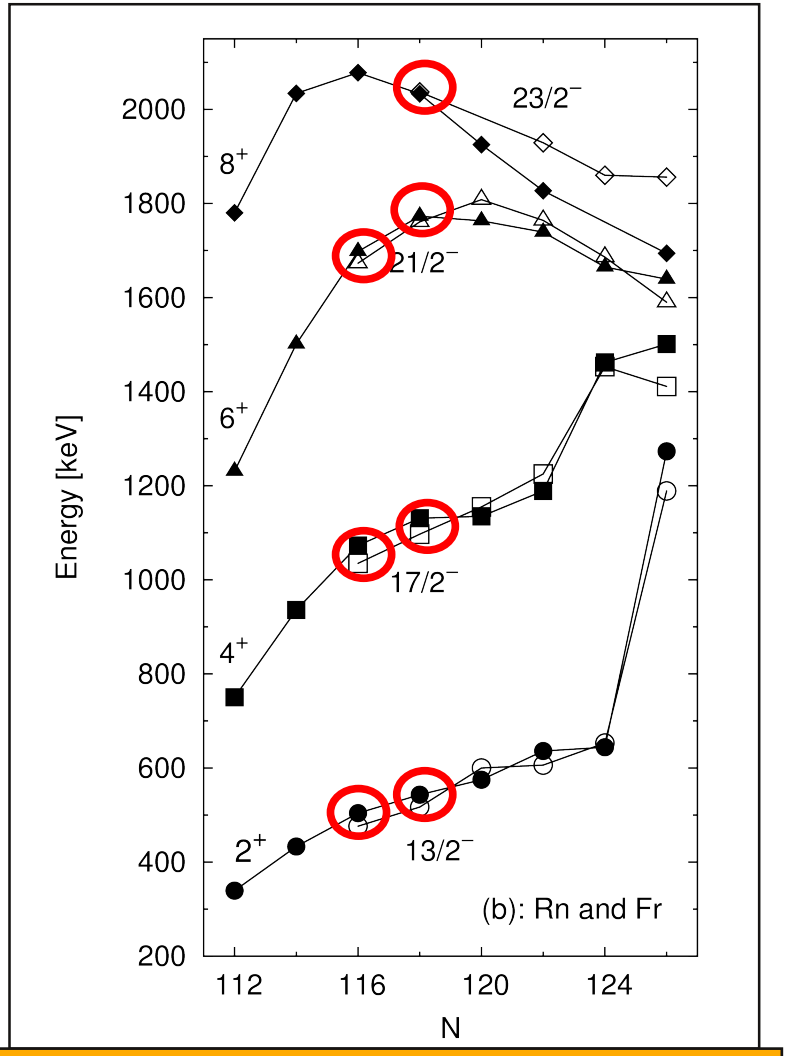
OBSERVED ISOMERIC STATES IN FRANCIUM AND ASTATINE NUCLEI



ONSET OF GROUND STATE DEFORMATION IN ASTATINE AND FRANCIUM NUCLEI



Astatine nuclei compared with polonium isotones



Francium nuclei compared with radon isotones

THANK YOU!

COLLABORATORS:

KTH: K. Andgren, T. Bäck, B. Cederwall, B. Hadinia, A. Johnson, A. Khaplanov, M. Sandzelius, R. Wyss

JYFL: J. Uusitalo, S. Juutinen, M. Leino, P. Nieminen, P. T. Greenlees, P. Jones, R. Julin, S. Ketelhut, M. Nyman, P. Peura, P. Rahkila, P. Ruotsalainen, J. Sarén, C. Scholey, K. Auranen, T. Enqvist, P. Kuusiniemi and J. Sorri

CSNSM: K. Hauschild