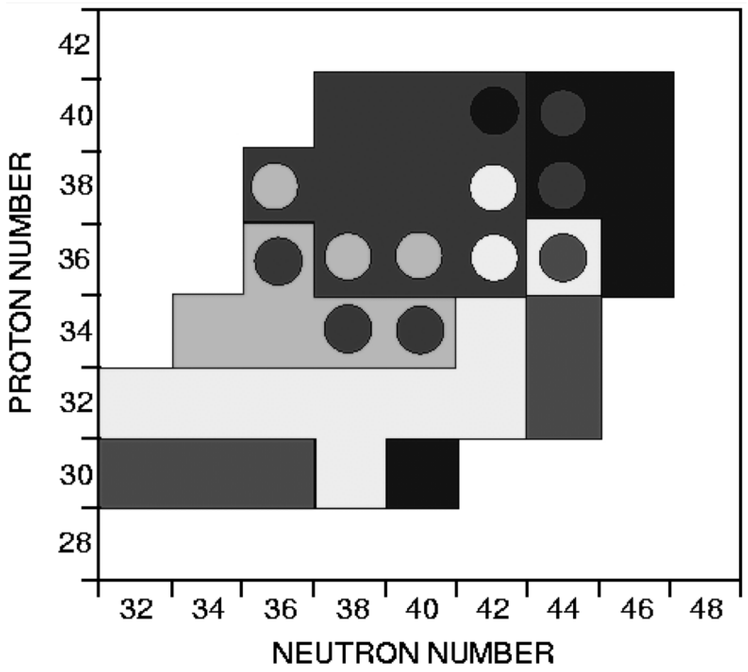
Precision tests of shape coexistence in the light krypton isotopes

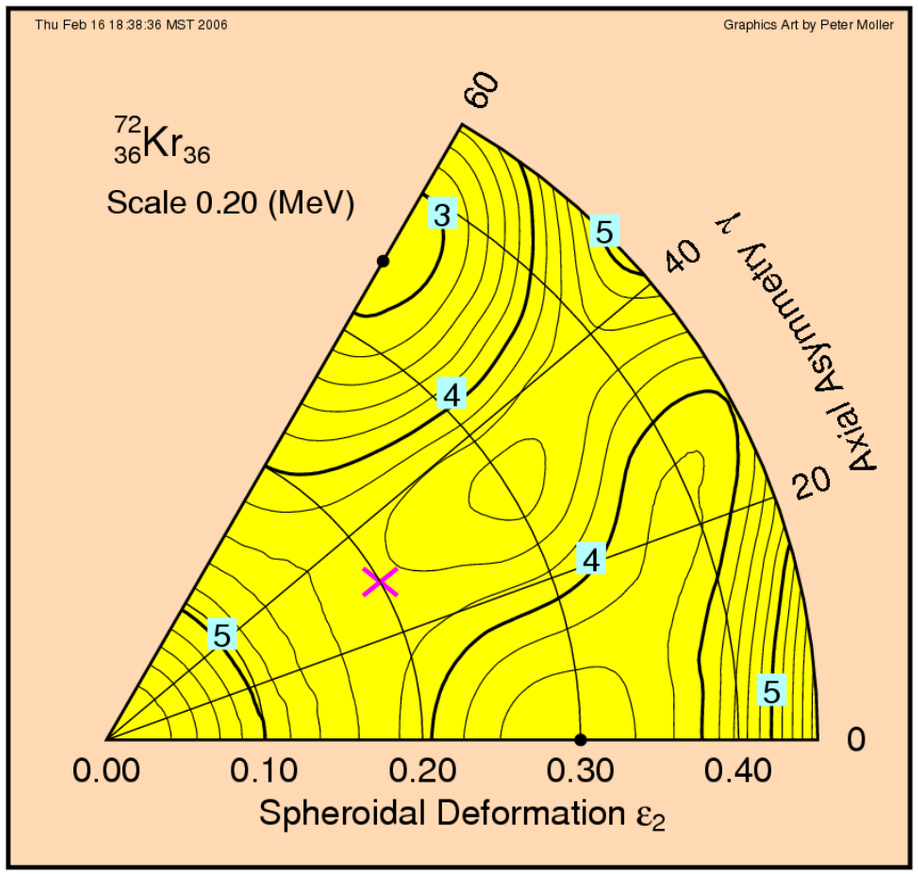
David Jenkins and Wilton Catford
on behalf of the solenoidal spectrometer collaboration

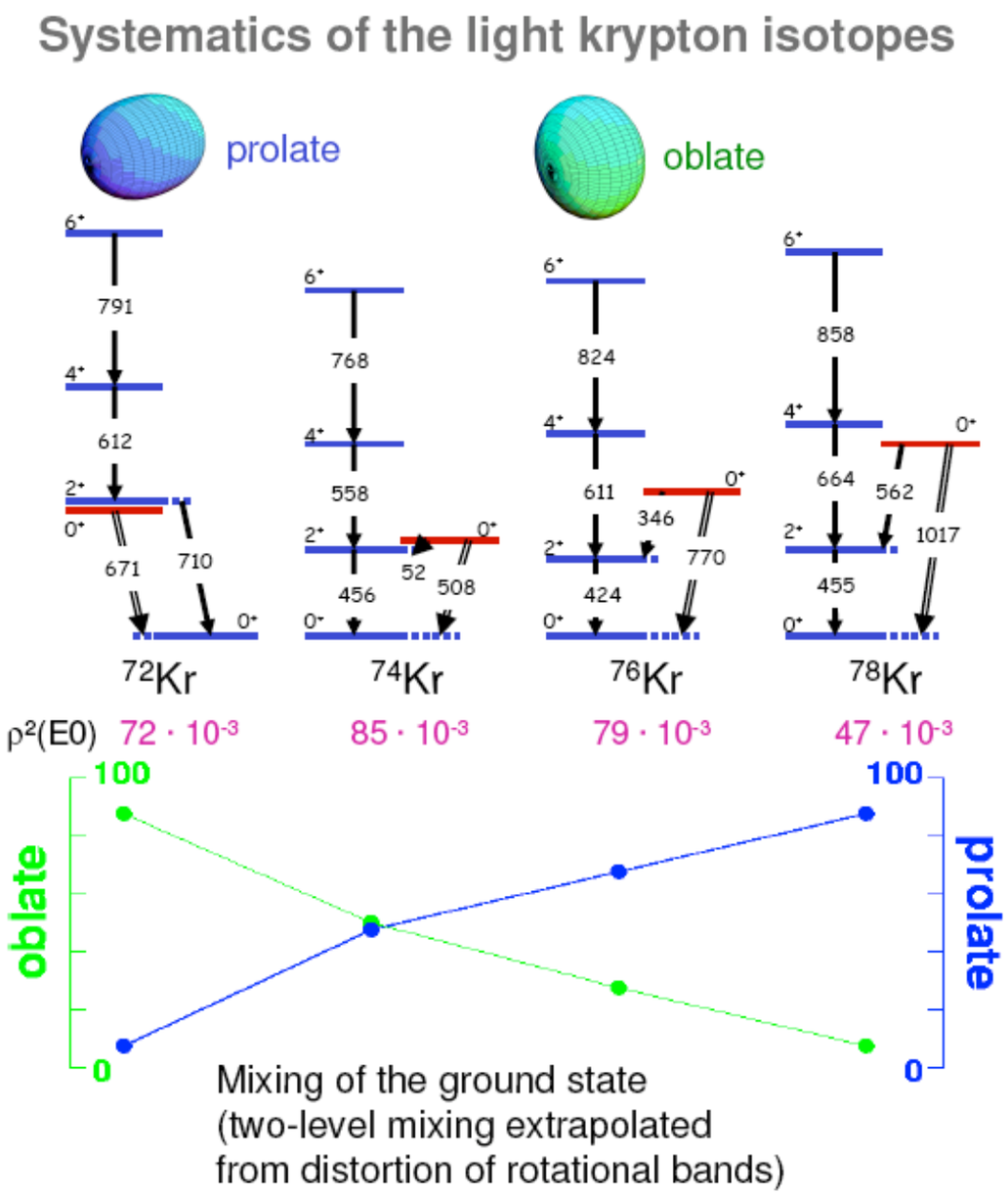
THE UNIVERSITY of York

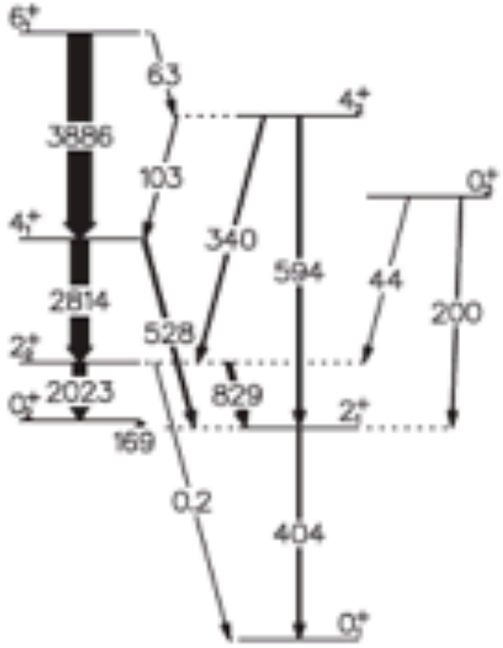
UNIVERSITY OF SURREY

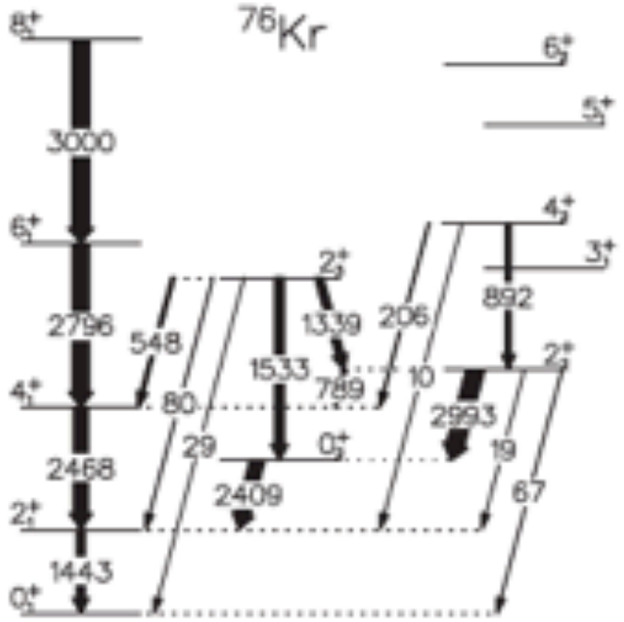


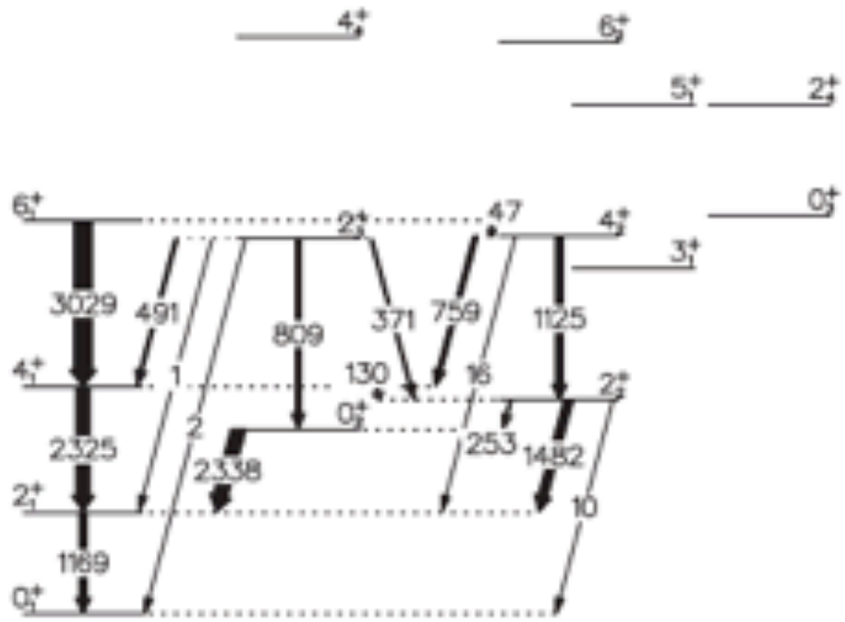
Very Prolate
Oblate
Triaxial

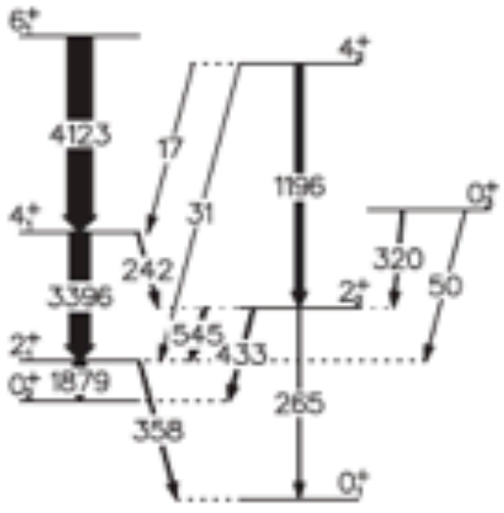




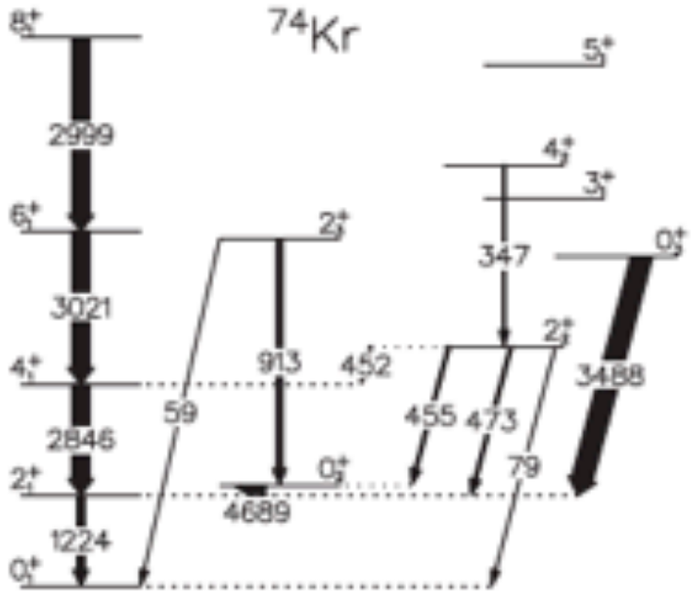




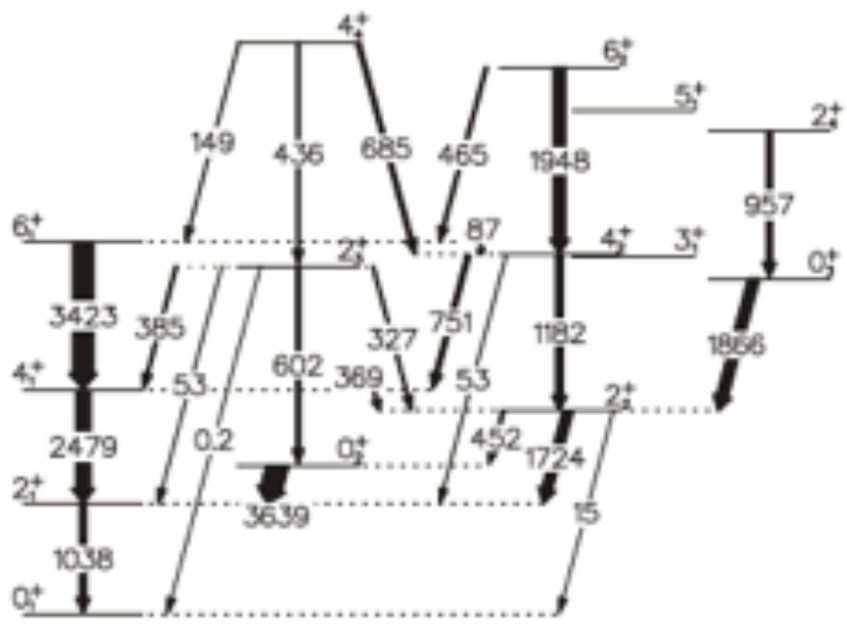




Skyrme



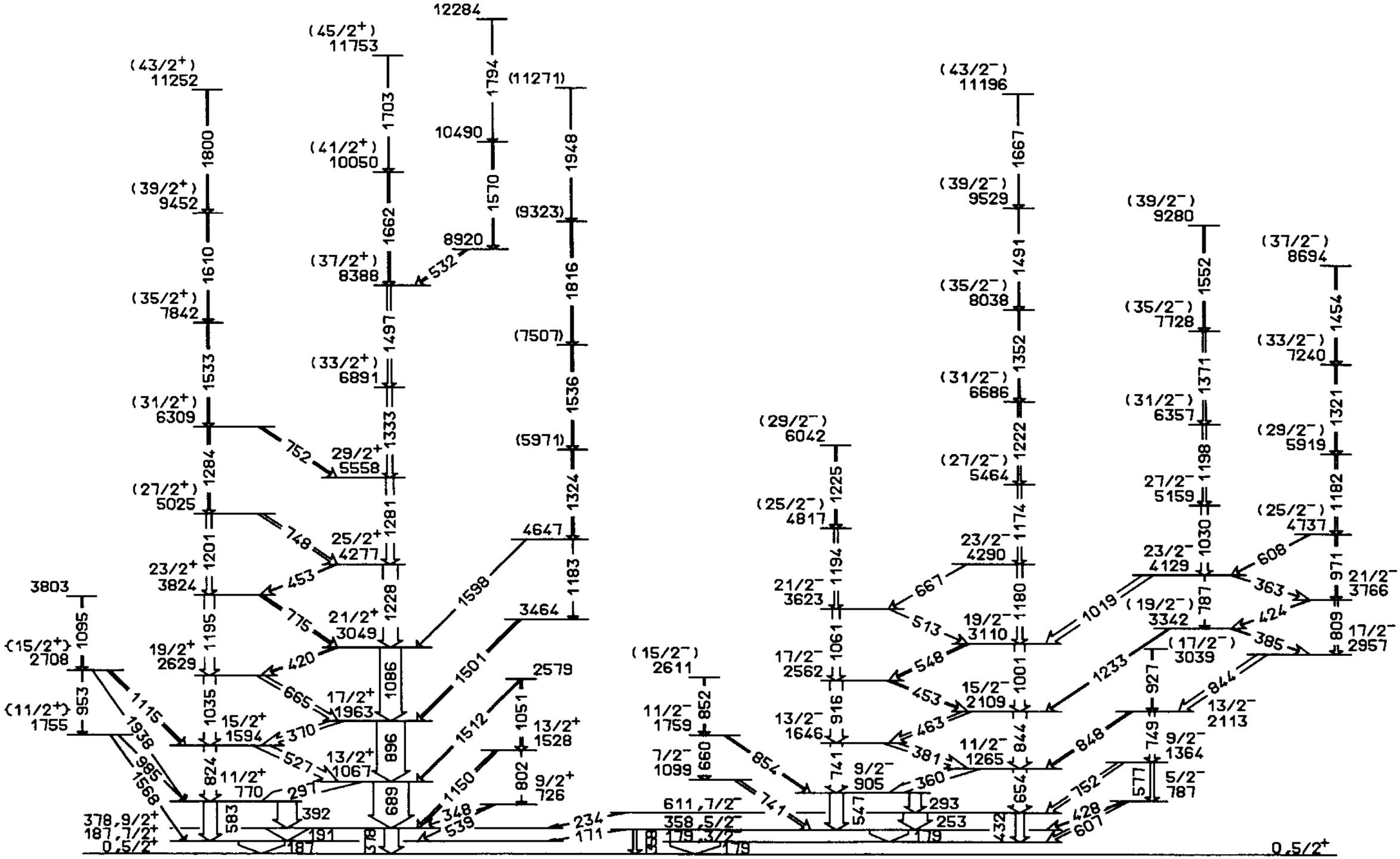
experiment



Gogny

E. Clement et al., Phys. Rev. C 75, 054313 (2007).

S. Skoda et al., Nucl. Phys. A633, 565 (1998)



[422]5/2
(very prolate)

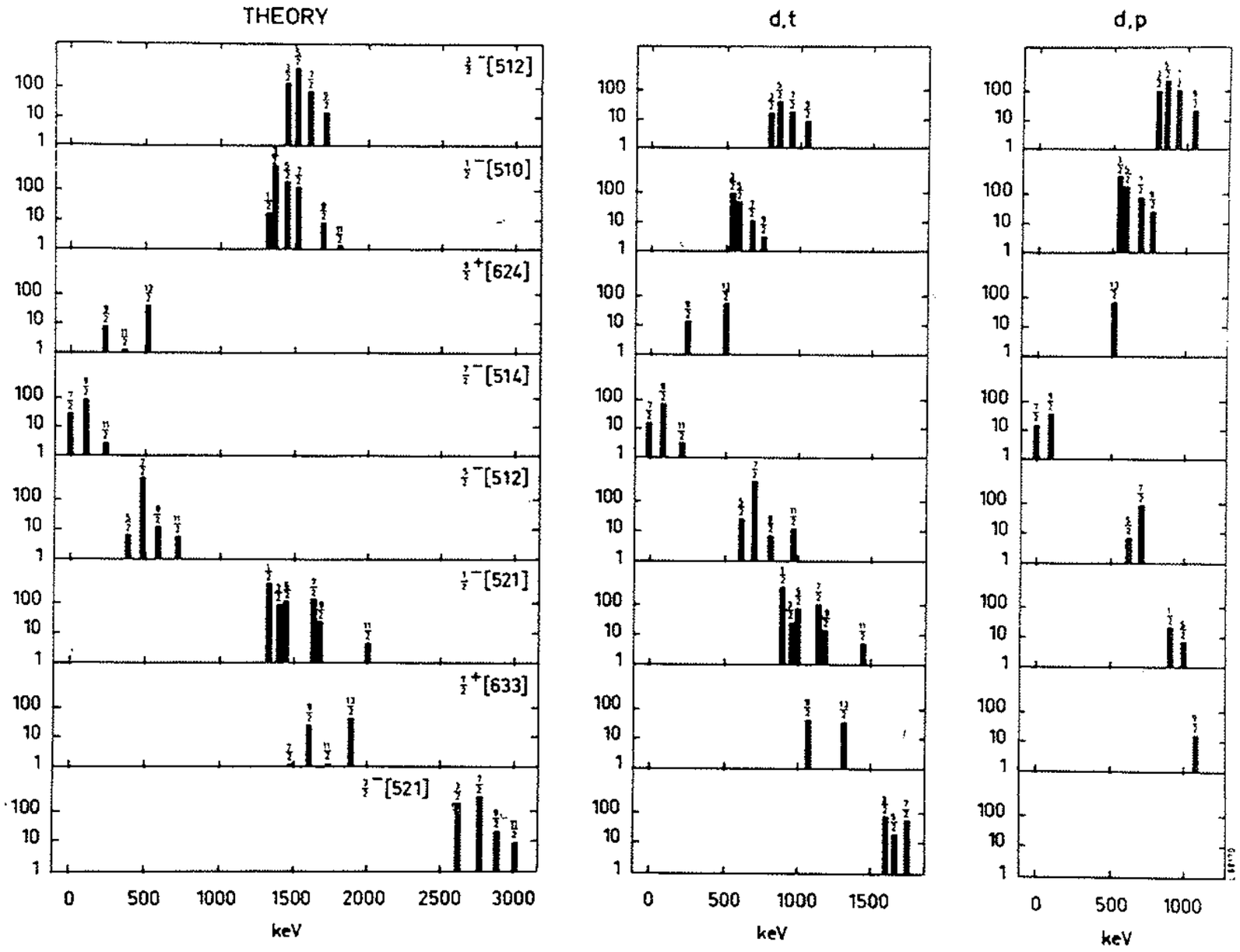
[404]9/2
(oblate?)

^{75}Kr

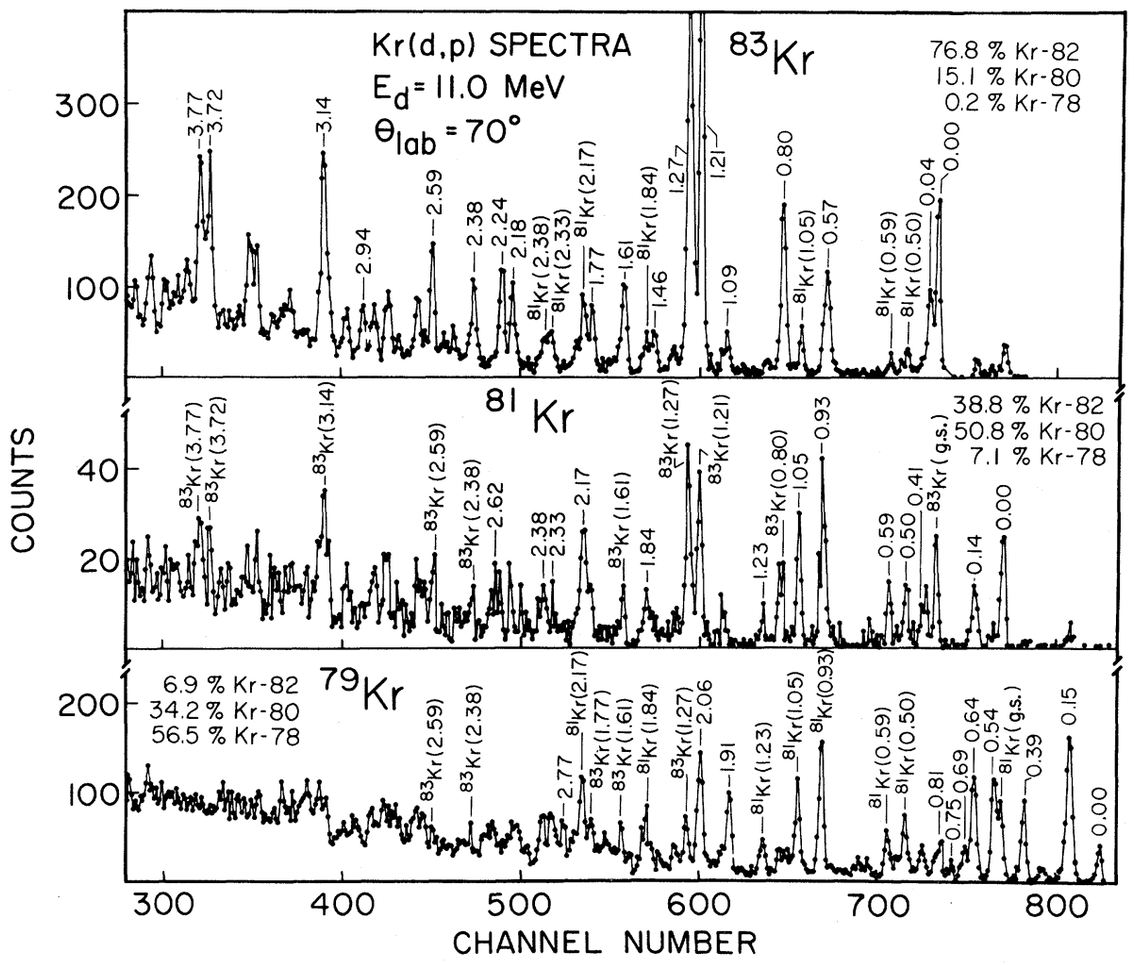
mixed...
(very prolate)

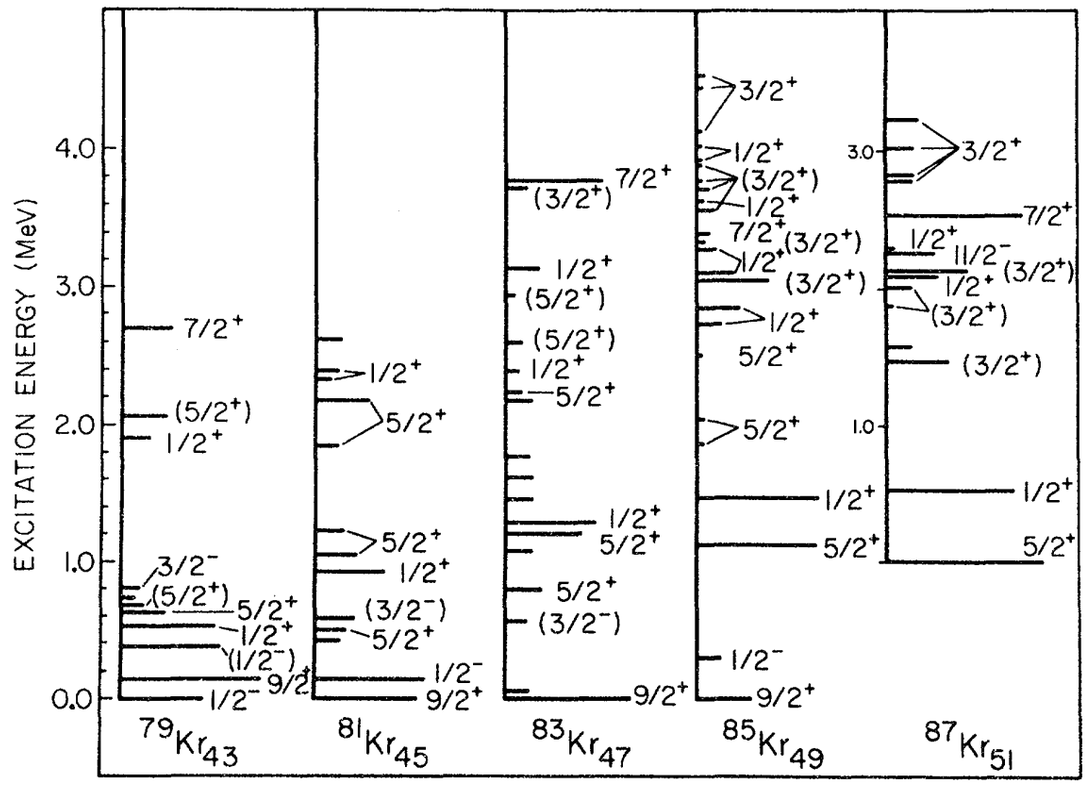
[301]1/2
(oblate?)

“Fingerprints of deformation”

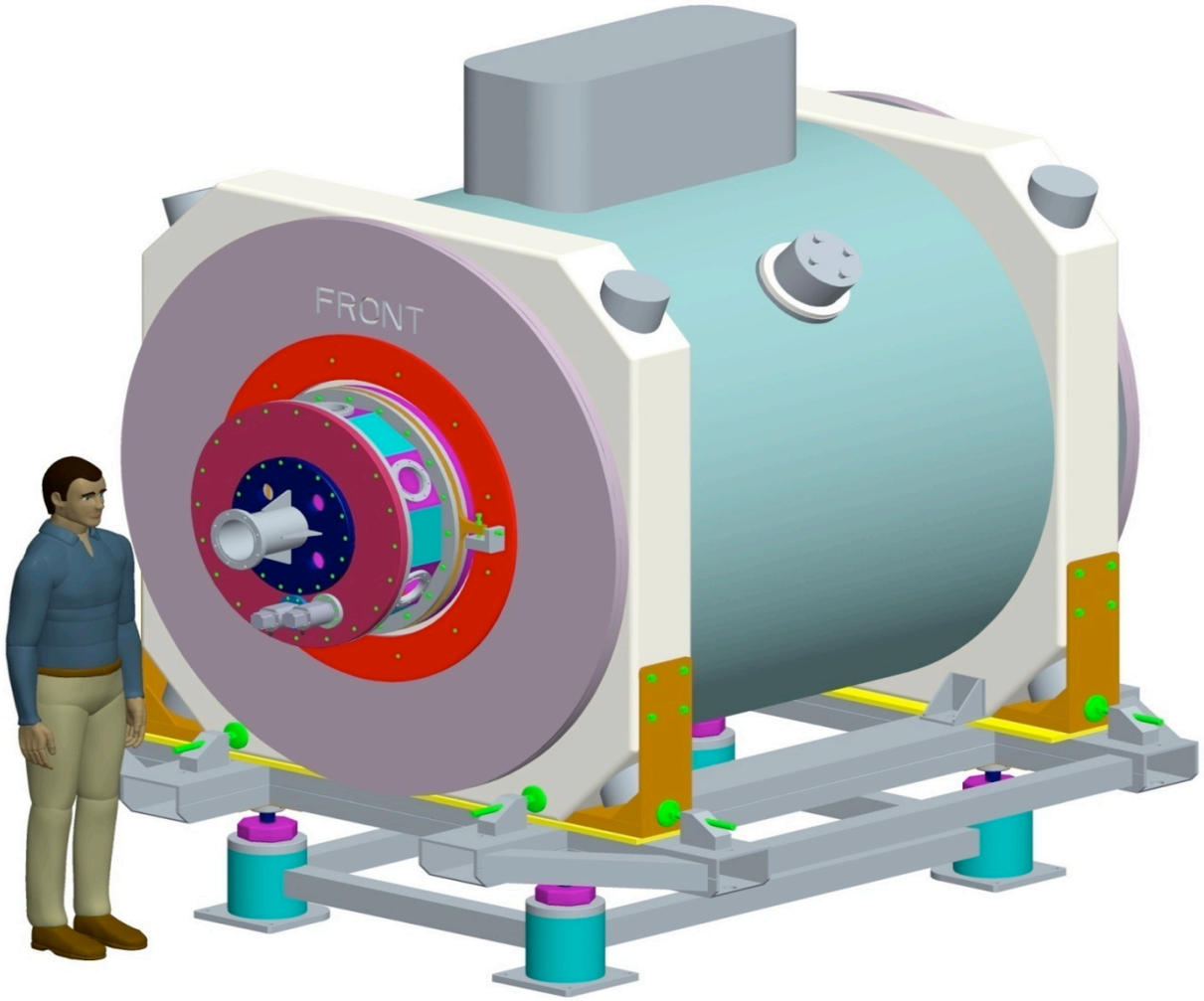


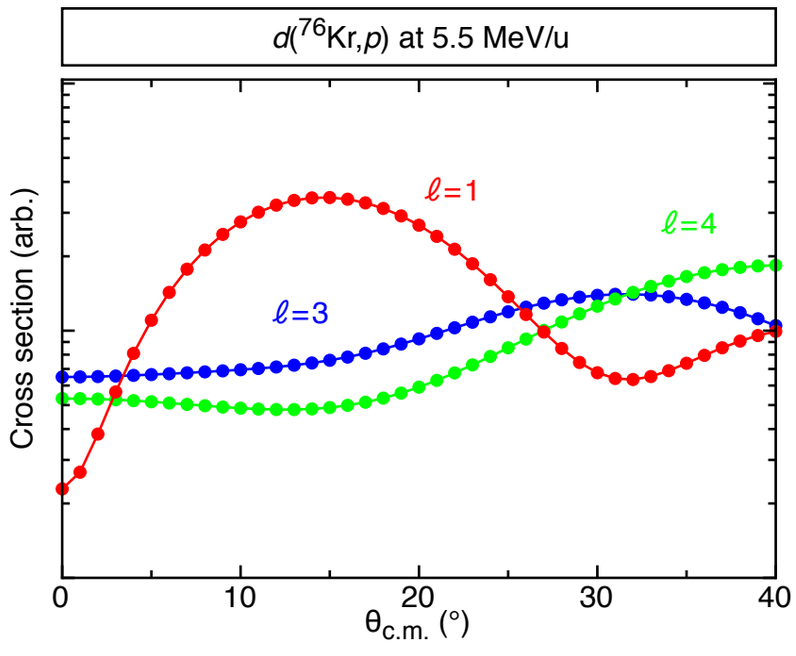
B. Elbek and P.O. Tjom, Adv. Nucl. Phys. 3, 259 (1969)

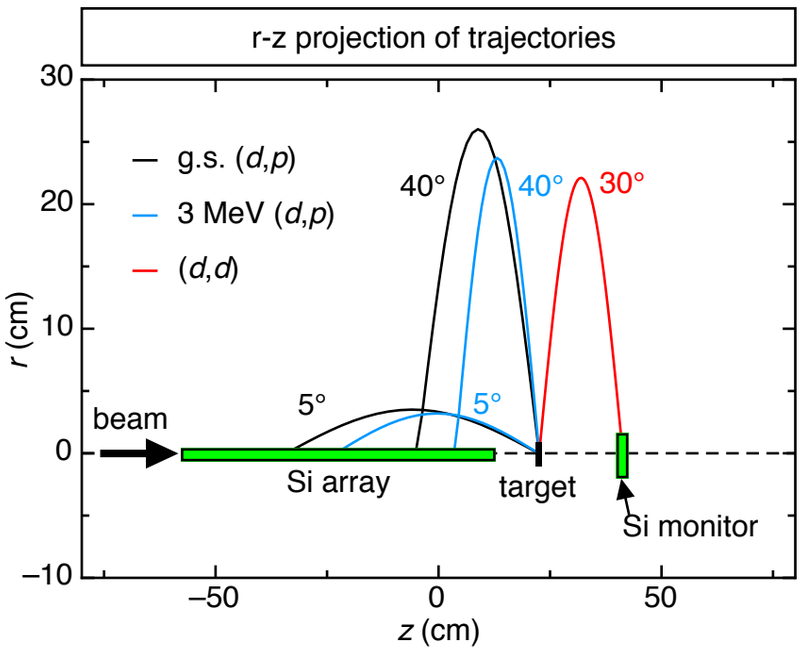




In the present case, the spectra will be complex BUT we know level energies to high precision and so can do a fit.


FRONT


d(76Kr,p) at 5.5 MeV/u
Cross section (arb.)
θc.m. (°)
ℓ=1
ℓ=3
ℓ=4
0
10
20
30
40


r-z projection of trajectories
g.s. (d,p)
3 MeV (d,p)
(d,d)
40°
40°
30°
5°
5°
beam
Si array
target
Si monitor
r (cm)
z (cm)
30
20
10
0
−10
−50
0
50

Beamtime estimate and perspectives

Limit is ~ 10^4 /s for one week run (from experience of HELIOS at Argonne National Laboratory)

^{76}Kr - 3.6 X 10^6 /s on target - 12 shifts

^{74}Kr - 1.8 X 10^4 /s on target - 21 shifts

Beams expected to be 100% pure using Nb target and cooled transfer line - strongly advantageous for “Day-1” experiment