Band structure of ^{235}U

D. Ward[1], R.M. Clark[1], D. Cline[2], M. Cromaz[1], M.A. Deleplanque[1], R.M. Diamond[1], P. Fallon[1], G.J. Lane[1,3], I.Y. Lee[1], A. Goergen[1,4], A.B.Hayes[2], A.O. Macchiavelli[1], T.Nakatsukasa[5] R.Teng[2], F.S. Stephens[1], C.E. Svensson[1,6], K. Vetter[1,7], C-Y Wu[2].

[1]Nuclear Science Division, Lawrence Berkeley National Laboratory, Berkeley, California 94720

[2]Department of Physics, University of Rochester, Rochester, NY

[3]Nuclear Physics Department, Australian National University, Canberra, Australia

[4]DAPNIA/SphN,CEA Sarclay,F-91191 Gif-sur-Yvette,France

[5]University of Tsukuba,Tsukuba 305-8571, Japan

[6]Department of Physics, University of Guelph, Guelph, Ontario, Canada N1G2W1

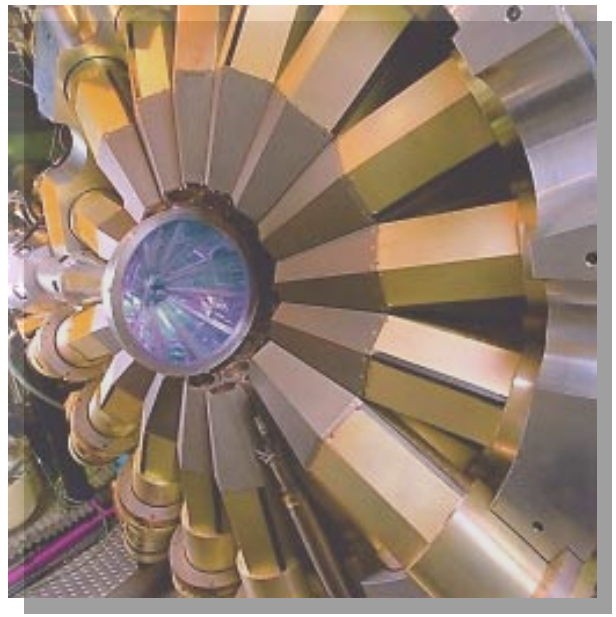
[7]Glenn T. Seaborg Institute, Lawrence Livermore National Laboratory, Livermore, California 94550.

Octupole Correlations and the Coriolis Interaction

3 Experiments: ^{235}U (thick target) was Coulomb-excited

LBNL's 88-Inch Cyclotron.

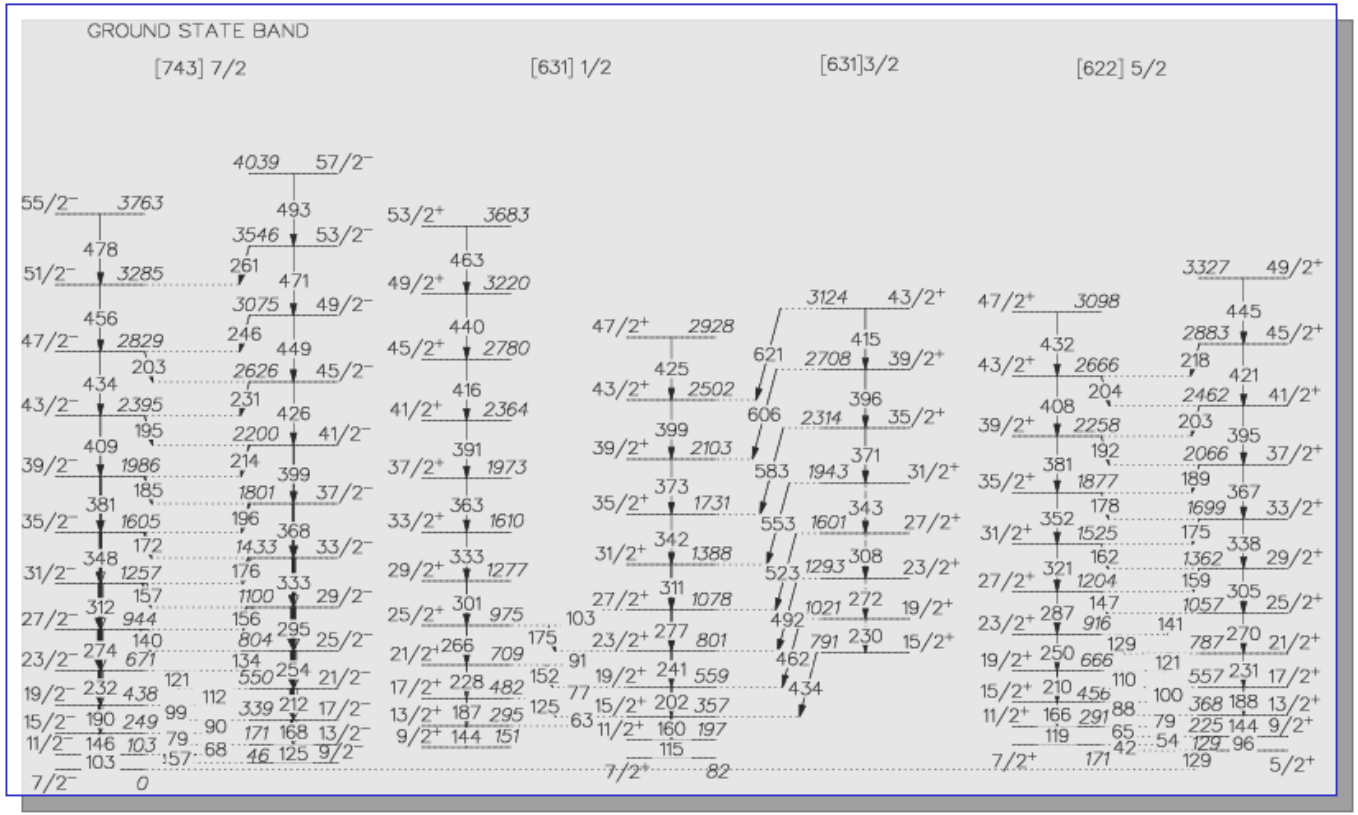
- Gammasphere - ^{136}Xe beam at 720 MeV
- 8π Spectrometer - ^{136}Xe beam at 720 MeV
- Gammasphere + CHICO - ^{40}Ar beam at 180 MeV.

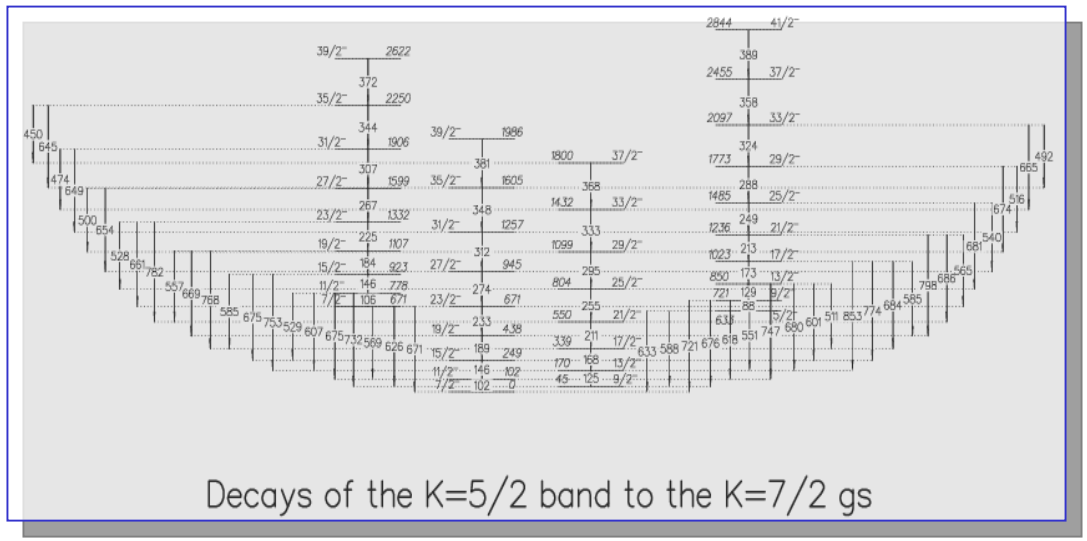


Extensive/complimentary data set(s)

- ~ 300 gamma-rays identified
- Allows precise comparison with codes to extract E2, E3 transition moments
- Far Higher angular momentum

^{235}U





Decays of the K=5/2 band to the K=7/2 gs

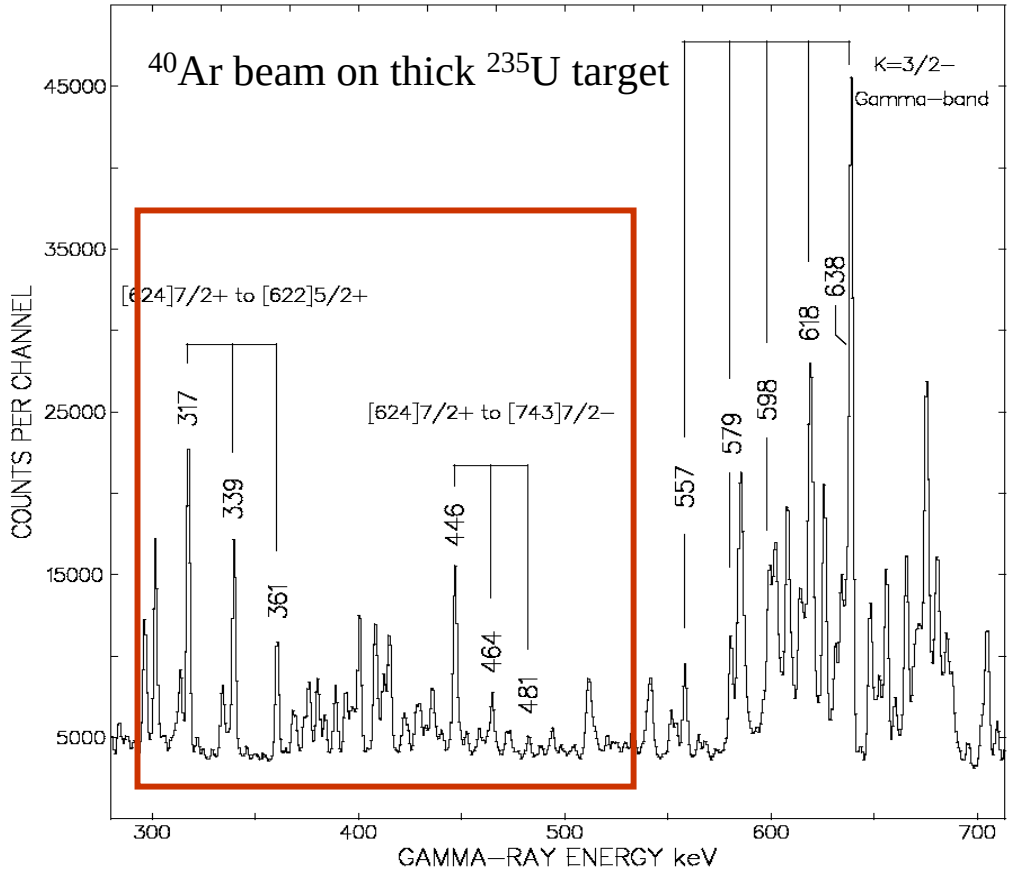
^{235}U - Octupole Correlations

Unexpected feature – strong direct population of the +ve parity states

Octupole strength is large and spread out among Nilsson states

First evidence for E3 strength in ^{235}U

B(E3) ~ 0.1 e^2b^3



^{235}U - Coriolis Attenuation

Outstanding Problem - Coriolis Attenuation

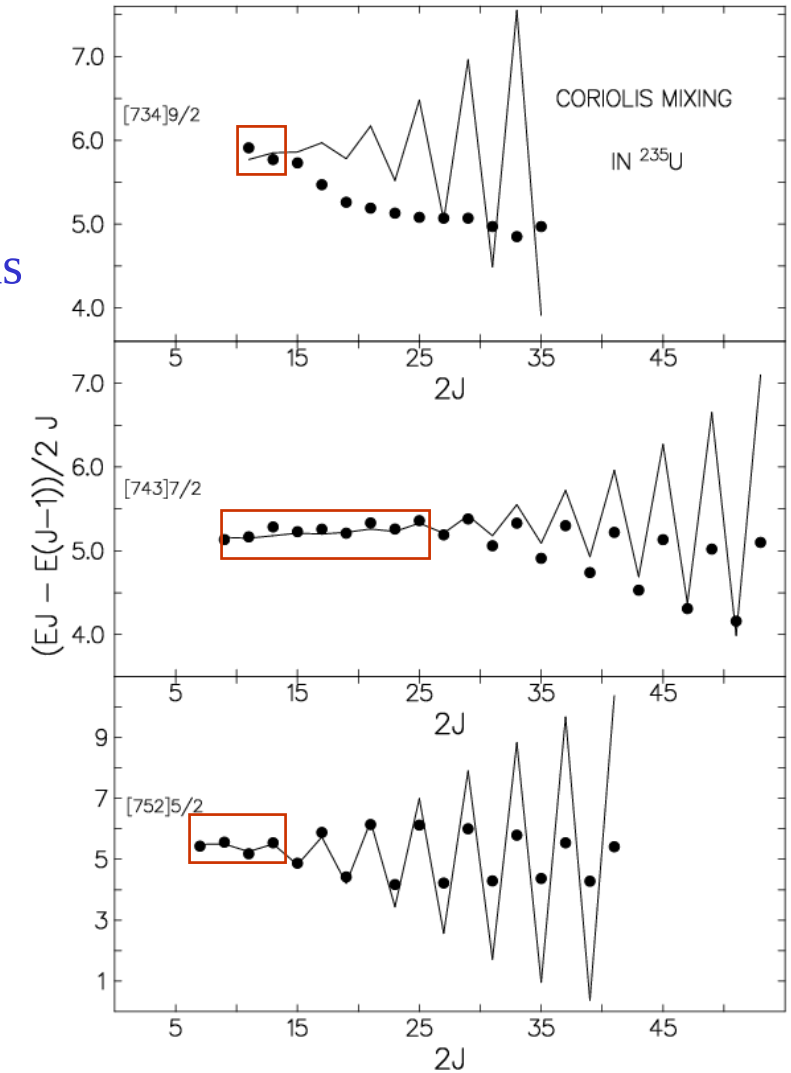
^{235}U classic example (N=7, $j_{15/2}$ neutron)

Coriolis coupling between $j_{15/2}$ (multiplet) bands is ~ 0.6 of expected value

Assumption : Pure ($j_{15/2}$) intruder state

The observed octupole correlations mean $j_{15/2}$ is mixed with other states and "N=7" content is diluted – **cause of the attenuation**.

More Physics .. high spin behavior
Octupoles ? Band mixing ?
RPA calculations



publication being prepared