Title

Experimental Study of Nuclei at High Angular Momenta

Author

Hillis, D L

Publication Date

1979

To be presented at the American Chemical Society Meeting, Honolulu, Hawaii, April 1-6, 1979

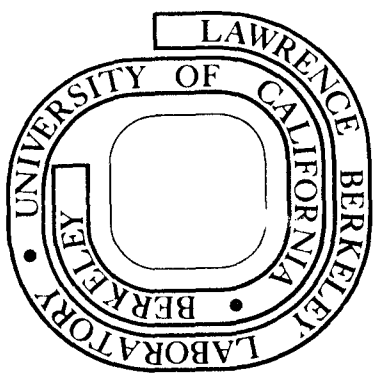
LBL-8261
Abstract

EXPERIMENTAL STUDY OF NUCLEI AT HIGH ANGULAR MOMENTA

D. L. Hillis

January 1979

Prepared for the U. S. Department of Energy
under Contract W-7405-ENG-48



DISCLAIMER

NUCLEAR CHEMISTRY AND TECHNOLOGY

LBL-8261 Abs.

EXPERIMENTAL STUDY OF NUCLEI AT HIGH ANGULAR MOMENTA

40

Donald L. Hillis Nuclear Science Division
Lawrence Berkeley Laboratory
1 Cyclotron Road
Berkeley, CA 94720

xx xx

Physicist, Ph.D.

GSI, Darmstadt; Niels Bohr Institute, Copenhagen

xx Phys. Rev.

Overhead projector

EXPERIMENTAL STUDY OF NUCLEI AT HIGH ANGULAR MOMENTA.* D. L. Hillis, Niels Bohr Institute, Copenhagen, and Lawrence Berkeley Laboratory, Berkeley, CA 94720.

In the collision of two heavy ions at incident energies not too far above the interaction barrier, most of the reaction cross section goes into forming a compound system at high excitation energy, E_x, and large angular momenta, ℓ. After the emission of several particles, a broad region of ℓ and E_x for each evaporation residue is populated which can decay primarily by γ-ray emission. To investigate nuclei at the highest possible angular momenta, a new highly efficient technique[1] is used to study the γ-decay from various compound nuclei formed in the reactions $^{50}Ti + {}^{50}Ti$, $^{50}Ti + {}^{100}Mo$, and $^{50}Ti + {}^{110}Pd$ at several ^{50}Ti beam energies (150 MeV - 225 MeV). The method consists of measuring the total γ-decay energy released in each γ-ray cascade with a large NaI(Tl) crystal which surrounds the target in a geometry approaching 4π. Simultaneously, the average γ-ray multiplicity, which can be related to ℓ, is measured as a function of total γ-ray energy. From these data the moment of inertia, $\mathcal{J}$, of the nucleus at very large ℓ can be obtained. A preliminary analysis indicates that $\mathcal{J}$ ranges from (1.1 - 1.6) $\mathcal{J}_{rigid}$ for spins greater than $45\hbar$.

*Supported by the Danish Research Council, the Commemorative Association of the Japan World Exposition, and the U. S. Department of Energy, Division of Nuclear Physics.

[1]P. O. Tjøm, et al., Phys. Lett. 72B (1978) 439.

TECHNICAL INFORMATION DEPARTMENT
LAWRENCE BERKELEY LABORATORY
UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA 94720