

A quest for nuclear Jacobi shapes: the impact of Bent Herskind on theory and instrumentation developments

lundi 30 janvier 2023 11:25 (30 minutes)

The possibility of existence in atomic nuclei of the so called “Jacobi shape transitions”, the rapid shape changes at certain narrow angular momentum range from an oblate to a very elongated prolate shape (analogous to those predicted by Jacobi for rotating stellar objects), was postulated by theorists already in the early 1960's [1,2]. In the 90's, the Seattle group, and soon after the NBI Copenhagen group, studying the GDR gamma decay from hot rotating ^{45}Sc [3] and ^{46}Ti [4], nuclei observed signals interpreted as the first manifestations of the nuclear Jacobi shape transition.

However, the direct evidence for the existence of the Jacobi shape transition in ^{46}Ti nucleus came from the experiment performed in Strasbourg [5], where two arrays of gamma-ray detectors, scintillator array HECTOR and the germanium array EUROBALL, were coupled. Moreover, the interpretation of the results has become possible only because of the development of a theoretical approach referred to as Lublin-Strasbourg Drop (LSD) [6], which appeared simple to use by experimentalists.

Bent Herskind was pivotal to this achievement not only by taking part in the experiment and discussing the results, by also by his strong contribution to the development of the two detector arrays used, and also to the development of the links with the LSD model.

In the talk I will present the history of the quest for nuclear Jacobi shape transitions and the impact of Bent. In addition, I will present the current status of understanding of the phenomenon of nuclear Jacobi shape transitions, the status of the instrumentation (especially, construction of the new scintillator array PARIS [7]) and some outlook of the coming perspectives such as the search for the Poincare shape transitions [8].

References:

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Orateur: MAJ, Adam (IFJ PAN Krakow, Poland)

Classification de Session: Sesion 2: The science and impact of Bent Herskind (1931 - 2021)