Service de Physique Nucléaire

Séminaire

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CEA Saclay, Orme des Merisiers, Bât. 703, Salle 135

Angular momentum of spherical fission fragments

Friedrich Goennenwein

(University of Tuebingen)

Surprisingly even for fissioning nuclei with zero spin (e.g. ^{252}Cf(sf)) both fission fragments carry large angular momenta. This intriguing experimental observation has touched off a variety of theories for fragment spin. The theories proposed have all in common to trace the spin to the deformation of fragments near scission. Consequently, for spherical fragments all theories predict zero spin. However, in experiment sizeable if not the largest spins are measured for magic fragments with Z = 50 and/or N = 82 with nearly zero deformation even at scission. There are indications that, contrary to collective excitations invoked by theory, in these nuclei single particle excitations play the decisive role to create angular momentum. To prove the conjecture, fragment spins of the near-magic nucleus ^{132}Te have been studied at the Lohengrin spectrometer of the ILL. By analysing cold fission with ^{132}Te as one of the fragments it could indeed be shown that the large spins observed are not necessarily linked to fragment deformation. On the other hand there are shell model calculations available demonstrating that the high spin states in question are definitely of single-particle character. Single-particle excitations in particular in shell model nuclei like ^{132}Te are hence considered to be an alternative to the established spin pumping mechanisms for creating large fragment spins.

Le café sera servi 10 minutes avant

Contact : msoyeur@cea.fr Tel : 01 69 08 70 07

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