Angular momentum transfer in fragmentation reaction

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Spin oriented ensemble and angular momentum transferred to a nucleus produced by fragmentation reaction process at intermediate energies are good tools to investigate such a process. Spin-aligned and spin-polarised nuclei coming from fragmentation reactions have been studied by several group [1-3]. At relativistic energies, it has been observed that the spin-alignment is related to the linear momentum distribution of outgoing fragments [4]. It was then deduced that the angular momentum transfer, spin-alignment and spin-polarisation are directly linked to the reaction mechanism involved.

Experiments performed recently using the LISE3 spectrometer from GANIL facility have investigated the fragmentation reaction mechanism at intermediate energies. The study of the angular momentum transfer occurred during this process have been performed by looking at the population of well known short-lived isomeric states close as well as far from the projectile. The spin-alignment and spin-polarisation of outgoing fragments have been also studied by using the β-LMR and β-NMR experimental techniques [5]. For the first time, a spin-polarised secondary beam have been produced at GANIL.

Experimental results have been quantitatively reproduced in the framework of kinematical [6] and statistical [7] models of nuclear reactions. The predictive power of models shows the possibility to produce isomeric useful for the study of reaction mechanism involved by isomeric beam, spin-aligned and spin-polarised secondary beams by fragmentation reaction useful for nuclear moment measurements.

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