Service de Physique Nucléaire

Séminaire

le vendredi 16 février 2007 à 11h

CEA-Saclay DSM/DAPNIA/SPhN, Orme des Merisiers Bât. 703 Salle 135

Tracking experiments with micro-strip detectors at GSI:
1. Search for two-proton radioactivity of ^{19}Mg
2. Proton-proton correlations observed in fragmentation of ^{20}Mg and ^{17}Ne

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I will present the results of search of two-proton radioactivity of the ground state ^{19}Mg at the Projectile Mass Separator (FRS) at GSI. The ^{19}Mg ground state was predicted by the realistic three-body model [1] to have a half-life in the 0.5--700 ps time interval which overlaps with the decay-time range accessed at FRS. The ^{19}Mg decay in-flight was detected in triple ^{17}Ne+p+p coincidence by a newly developed detector array [2] consisting of four large area (7x4 cm^2), 640x384 micro-strip silicon detectors. The detectors measured the positions of hits of 2 protons and heavy-ion residue, allowing to reconstruct all product trajectories and respective coordinates, e.g., reaction vertexes, life-time distribution and proton-proton correlations.

Two-proton radioactivity and nuclear reactions with emission of 2 protons are characterised by a specific observable, p-p correlation which reflects both reaction mechanism and nuclear structure. For example, strong p-p correlations observed in 2-p radioactivity of the high-spin isomer (21$^+$) in ^{94}Ag [3] indicate that the parent nucleus is strongly cigar-like (prolate) deformed, and it emits the protons either from the same or from opposite ends of the cigar. The first data on p-p correlations in 2p-radioactivity and fragmentation reactions of ^{20}Mg and ^{17}Ne, the nuclear-structure implications and plans for further experimental and theoretical studies will be presented.

[1] *L. Grigorenko et al., Phys. Rev. Lett.* ***85****, 22 (2000).*
[2] *L. Cortina Gil et al., "Proposal for a silicon tracker with heavy ion identification capabilities", http://dpnc.unige.ch/ams/GSItracker/www.*
[3] *I. Mukha et al., Nature,* ***479,*** *298 (2006).*

Le café sera servi 10 minutes avant, en salle 125
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