

Intermediate Energies light RIBs Fragmentation

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The In-Flight method of producing Radioactive Ion Beams (RIBs) at intermediate and relativistic energies is mainly based on the Projectile Fragmentation process. The latter has been extensively studied for stable nuclei and accurate simulations can be made by existing codes. However recent disagreements have been found by comparing EPAX predictions to the unknown fragmentation cross section of light radioactive ions [1]. Both to prove the feasibility of measurements with the "tagged" RIBs produced at the LNS [2] and to study the fragmentation process of light radioactive beams we have performed the EXPERA experiment. The RIBs produced by the fragmentation of a ^{20}Ne primary beam at 45 A MeV and 300 enA of current on a ^9Be 500 μm thick production target, were selected and transported up to the TRASMA LNS scattering chamber and tagged by a 300 μm 5x5 cm² Silicon X-Y strip detector 16x16 before to interact with ^{12}C and ^{208}Pb targets. Reaction products were detected by two Hodoscope covering the forward hemisphere from 0° to 35° polar angles. Figure 1 illustrates the tagging technique: for every event the incoming ion, its position and the products of the interaction are identified. Therefore, several reactions can be studied simultaneously. Figure 2 shows, as an example, the total cross section,

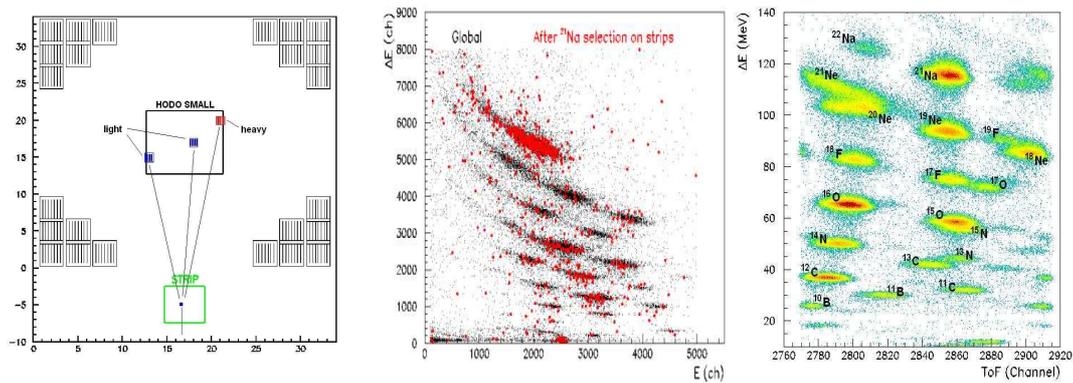


Figure 1: The tagging technique: left: event tracking, middle: the black dots refer to inclusive data in a forward telescope, the red ones to the products detected in the same telescope when the ^{21}Na is selected in the ΔE -ToF plot of the Si-Strip signal vs the RF one. (right)

background subtracted, of the individual fragments produced in the fragmentation of the ^{21}Na on the ^{12}C target.

Results and perspective of the EXPERA experiment will be presented.

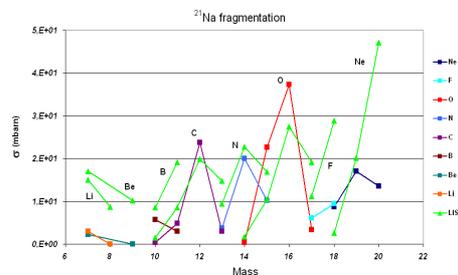


Figure 2: Solid angle and energy integrated cross sections relative to the fragmentation of the ^{21}Na compared with the EPAX predictions.

[1] K.-H. Schmidt et al., Nucl. Phys. A 710 (2002) 157.

[2] E. Rapisarda et al., this Conference.