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Cross Section Measurements for large angle fragments production in the nuclear interaction of ^{12}C on C, CH and PMMA thin targets.

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The study of the nuclear fragmentation of ^{12}C at the Particle Therapy beam energies is important for the development of even more specific treatment plans and also for the development of range monitoring techniques based on charged secondary particles. In this contribution, the fragmentation cross sections of 115 – 353 MeV/u kinetic energy carbon ion beams impinging over thin targets of graphite (C), PMMA ($C_2O_5H_8$) and polyethilene (C_9H_{10}) will be presented, for fragments measured at 90° and 60° at the CNAO particle therapy center (Pavia, Italy) by the FOOT collaboration. Thin plastic scintillator detectors have been exploited for the measurement of fragments time-of-flight and energy loss. The deposited energy in thick LYSO crystals has been combined with thin plastic scintillators measurements to perform the fragment identification in charge and mass (Z=1, M=^1H, ^2H, ^3H). The preliminary results of the differential cross sections have been expressed as a function of the kinetic energy of the fragments at production thanks to an unfolding technique applied to data. The analysis strategy has been successfully validated against the true Monte Carlo (MC) cross sections, computed by means of the FLUKA code. The experimental cross sections have been compared to the MC predictions and results will be presented.

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