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Quasi-elastic binary breakup in the interaction of ¹²C with ¹²C, ⁹³Nb and ¹⁹⁷Au at 400 MeV incident energy

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<p>In heavy ion reactions the emission of Intermediate Mass Fragments (IMFs) at forward angles is dominated by the direct break-up process. To improve our understanding of this process in the reaction mechanisms involving the interaction of light projectiles with light to heavy target nuclei, a coincidence measurement was performed at iThemba LABS. Standard ΔE-E detector telescopes were used to identify and measure the energies of the of the correlated <sup>

8</sup>Be and alpha particles produced in the binary break-up of ¹²C projectiles at an incident energy of 400 MeV. While the ⁸Be fragments were detected in their ground state at a fixed angle of 9°, the correlated alpha particles were measured on the opposite side of the beam, covering an angular range from 16° to 26°. Two dimensional energy spectra were generated for each alpha-particle angle in order to distinguish quasi-elastic events from inelastic break-up events. These spectra also allowed to identify events originating from the interaction of the ¹²C beam with an H contaminant on the target foils and to subsequently correct for these events in the extraction of angular distributions for alpha particles in coincidence with quasi-elastic ⁸Be particles. The angular distributions obtained from the interaction of ¹²C with ⁹³Nb and ¹⁹⁷Au show a smooth decreasing trend with respect to the alpha-particle angle, which suggests that the binary break-up of ¹²C seems to be independent of the target nucleus. A deviation from this trend is however observed for the ¹²C target. As a first attempt to interpret these results a comparison between the measured angular distributions and GEANT4 simulations will be presented.

Level (Hons, MSc,
   PhD, other)?

PhD

Consider for a student
   award (Yes / No)?

Yes

Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?

Yes

Primary author: Mr MIRA, Joele (University of Stellenbosch/iThemba LABS)

Co-authors: Prof. COWLEY, A. A (Department of Physics, University of Stellenbosch, Stellenbosch South Africa); Dr SMIT, F. D (Department of Nuclear Physics, iThemba Labs, Old Faure Road, Faure 7130); Dr STEYN, G.

F (Department of Nuclear Physics, iThemba Labs, Old Faure Road, Faure 7130); Dr USMAN, I. T (Department of Nuclear Physics, iThemba Labs, Old Faure Road, Faure 7130); Dr MABIALA, J (Department of Physics, University of Stellenbosch, Stellenbosch South Africa); Dr PAPKA, P (Department of Physics, University of Stellenbosch, Stellenbosch South Africa); Dr NEVELING, R (Department of Nuclear Physics, iThemba Labs, Old Faure Road, Faure 7130); Prof. CONNELL, S. H (Department of Physics, University of Johannesburg.); Dr FORTSCH, S. V (Department of Nuclear Physics, iThemba Labs, Old Faure Road, Faure 7130); Dr BUTHELEZI, Z. B (Department of Nuclear Physics, iThemba Labs, Old Faure Road, Faure 7130)

Presenter: Mr MIRA, Joele (University of Stellenbosch/iThemba LABS)

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