A direct measurement of the $^{27}Al(\alpha,p)^{30}Si$ cross section with TACTIC

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TRIUMF Annular Chamber for Tracking and Identification of Charged Particles (TACTIC) is a cylindrical Active Target Time Projection Chamber (TPC) designed to study alpha-induced charged-particle reactions of astrophysical significance. TACTIC employs the micro-resistive well detector (μRWELL) as the gas amplification stage, enabling excellent tracking of charged particles, in the energy range of a few keV to several MeV, due to the high gain ($>10^4$). Recently, the first measurement of the $^{27}Al(\alpha,p)^{30}Si$ reaction cross section in the Gamow window was performed at TRIUMF, using a ^{27}Al beam at 1.65 MeV/u. The $^{27}Al(\alpha,p)^{30}Si$ reaction is important for the improvement of existing core-collapse supernovae (CCSNe) model calculations, by modifying the flow of material to heavier masses, specifically affecting the production of ^{56}Ni .

TACTIC utilises a thick target technique, enabling the excitation function over the entire energy region of interest to be measured simultaneously with one beam energy, resulting in a time-efficient measurement. Initial analysis from this experiment will be presented, alongside simulation based work performed in the NPTool framework.