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The Search for α-Clustered Toroidal Nuclei in ^{28}Si[1] ANDY HANNAMAN, KRIS HAGEL, ALAN MCINTOSH, MIKE YOUNGS, Texas A&M Cyclotron Institute, MOLLY ASLIN, Mount Holyoke College, LAUREN MCINTOSH, SHERRY YENNELLO, Texas A&M Cyclotron Institute — Ground state stable nuclei typically have spherical geometries, however given excitation energy and/or angular momentum, they may exhibit exotic shapes and form α-particle clusters within their bulk. It is predicted that such clustering can promote the production of angular-momentum stabilized toroidal nuclei. By studying the 7-α particle disassembly of ^{28}Si + ^{12}C at 35 MeV/nucleon, an experiment performed on the NIMROD detector array observed evidence of high excitation energy peaks in the same range as predicted toroidal high-spin isomer states [1]. However, the peaks were not well resolved due to the angular resolution of NIMROD. The FAUST detector array uses dual-axis duo-lateral (DADL) position sensitive silicon detectors capable of sub-1mm position resolution. The mechanism of charge splitting in the DADL detector gives position-dependent characteristics in the pulse shape that lead to distortions in position reconstruction. A new waveform analysis method has been developed that reliably extracts charge values, yielding improved linearity in position reconstruction and energy resolution. A precision measurement using FAUST can provide insight to the α-clustered structure and exotic deformation of nuclei. [1]Phys. Rev. C 99, 014606 (2019)

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