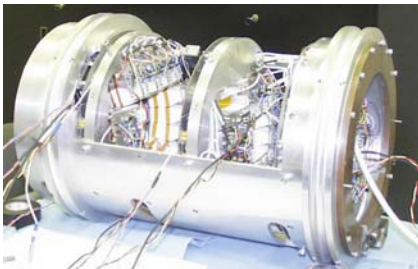


# Isospin Dependence of Quasiprojectile Fragmentation using Mass 40 Isobars on $^{112,124}\text{Sn}$ Using FAUST

A.L. Keksis, M. Veselsky, G.A. Souliotis, E. Martin, D. Shetty, and S.J. Yennello

The isospin asymmetry term in the nuclear equation of state, EOS, can be studied using isobaric nuclei. The EOS is important for understanding astrophysical processes, such as neutron star cooling and the r-process [1, 2]. Increasing the isospin asymmetry produces new phenomena such as proton and neutron halos, and changes nuclear properties such as the nuclear density [3, 4].

This research was performed at Texas A&M University's Cyclotron Institute using FAUST [5, 6], the **F**orward **A**rray **U**sing **S**ilicon **T**echnology shown in Figure 1. The calibration and gating procedures were previously described [7]. During this period the Decoding and Analysis procedures have been under development. There are two paths that are being pursued. One focuses on adapting the new lab standard, CycApps, which was developed for NIMROD data, to handle FAUST data. The other focuses on another NIMROD analysis program, which was used successfully by Veselsky to analyze FAUST data.



**Figure 1:** The FAUST forward array.

As of this writing systematic measurements with stable beams of  $^{40}\text{Ca}$ ,  $^{40}\text{Ar}$  and  $^{48}\text{Ca}$  at 32 and 45 MeV/u are underway. Then using the Superconducting Solenoid Rare Isotope Beam Line [8] rare ion beams such as  $^{40}\text{Sc}$  ( $t_{1/2}$  0.1823 sec.),  $^{40}\text{Cl}$  ( $t_{1/2}$  1.35 min.) and possibly  $^{40}\text{S}$  ( $t_{1/2}$  8.8 sec.) will be produced and identified with TOF techniques. Rare ion beams allow for greater isospin asymmetric nuclei to be studied, which is one area that is of great interest since a plethora of beams will be available when RIA, the **R**are **I**sotope **A**ccelerator, comes online early next decade.

## References

- [1] B.A. Li *et. al.*, Int. J. Mod. Phys. E **7**, 147 (1998).
- [2] B.A. Li., Phys. Rev. Lett. **85**, 4221 (2000).
- [3] J. Symons (Chair) *et. al.*, Opportunities in Nuclear Science: A Long-Range Plan for the Next Decade. April 2002.
- [4] M. Colonna *et. al.*, Phys. Rev. C **57**, 1410 (1998).
- [5] F. Gimeno-Nogues *et al.*, Nucl. Instr. And Meth. A **399**, 94 (1997).
- [6] R. Laforest *et. al.*, Nucl. Instr. And Meth. A **404**, 470 (1998).
- [7] A. L. Keksis *et. al.*, *Progress in Research*, Cyclotron Institute, Texas A&M University (2001-2002), p. II-38.
- [8] T.W. O'Donnell *et. al.*, Nucl. Instr. And Meth. A **422**, 513 (1999) and **353**, 215 (1994).