

EXPERIMENTAL CONSTRAINTS ON THE NUCLEOSYNTHESIS OF ^{60}Fe IN MASSIVE STARS

Ethan Uberseder
University of Notre Dame
Monday, October 10, 2011
4:00 P.M. NSH 124

The nucleosynthesis of ^{60}Fe is one of the current outstanding problems in nuclear astrophysics. Observations of galactic radioactivity by gamma-ray telescopes have provided a direct measurement of the $^{60}\text{Fe}/^{26}\text{Al}$ ratio dispersed across the galactic plane. As the two isotopes are thought to be produced in similar stellar environments, the ratio provides a unique constraint on current stellar models.

While uncertainties still exist in the stellar models themselves, it is important to constrain the nuclear physics inputs to make any comparison with observation meaningful and reliable. A recent measurement of the $^{60}\text{Fe}(n,g)^{61}\text{Fe}$ reaction has provided a first experimental quantification of the destruction rate. Currently, no experimental data exist for the $^{59}\text{Fe}(n,g)^{60}\text{Fe}$ production rate. To address this void, a Coulomb dissociation experiment has been performed at GSI in an attempt to indirectly quantify the neutron capture cross section of ^{59}Fe . The analysis is currently ongoing, and preliminary results will be discussed.

Nuclear
Seminar

All interested
persons are
cordially
invited to
attend.