Abstract Submitted
for the DNP16 Meeting of
The American Physical Society

Enhancement of the triple alpha process in hot, dense environments[1] MARY BEARD, University of Notre Dame, SAM M. AUSTIN, RICHARD CYBURT, National Superconducting Cyclotron Laboratory, Michigan State University — The triple alpha process plays a particularly important role in nuclear astrophysics, bridging the A=5 and A=8 stability gaps, producing ^{12}C . The reaction itself proceeds via the 0+ (Hoyle) resonance at 7.65 MeV in ^{12}C, at a rate proportional to the radiative width of the state. For sufficiently hot and dense environments, the rate of the triple alpha reaction is significantly enhanced by hadronic inelastic scattering that de-excites the Hoyle state. We present theoretical calculations for the enhancement of the triple alpha rate based on inelastic n, p and alpha cross sections. For comparable densities, neutrons play the largest role.

[1]NSCL PHY11-02511, JINA-CEE PHY14-30152

Mary Beard
University of Notre Dame

Date submitted: 27 Jun 2016 Electronic form version 1.4