Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Sensitivity of Ti-44 and Ni-56 production in shock-driven nucleosynthesis to nuclear reaction rate variations and the case of 39K(p,g)40Ca.[1] SHIV K. SUBEDI, ZACH MEISEL, GRANT MERZ, Ohio Univ — Recent observational advances have enabled high resolution mapping of Ti-44 in core-collapse supernova (CCSN) remnants. Comparisons between observations and 3D models provide stringent constraints on the CCSN mechanism. However, recent work has identified several uncertain nuclear reaction rates that influence Ti-44 and Ni-56 production in model calculations of shock-driven nucleosynthesis. We evolved 15M, 18M, 22M and 25M stars from ZAMS to CCSN in MESA (Modules for Experiments in Stellar Astrophysics) and investigated previously identified sensitivities of Ti-44 and Ni-56 production in CCSN to varied reaction rates. I will present our final results of this sensitivity study. I will also briefly discuss the current analysis status of direct cross section measurement of 39K(p,g) which is motivated by the sensitivity study.

[1]This work was supported by the U.S. Department of Energy under grants DE-FG02-88ER40387 and DE-SC0019042, the National Nuclear Security Administration under grant DE-NA0003909, and has benefited from support by the National Science Foundation under grant PHY-1430152 (Joint Institute for Nuclear Astrophysics–Center for the Evolution of the Elements).

Shiv K. Subedi
Ohio Univ

Date submitted: 19 Jun 2020 Electronic form version 1.4