

Abstract Submitted
for the APR15 Meeting of
The American Physical Society

Underground Nuclear Astrophysics – from LUNA to CASPAR

FRANK STRIEDER, South Dakota School of Mines and Technology, CASPAR COLLABORATION — It is in the nature of astrophysics that many of the processes and objects are physically inaccessible. Thus, it is important that those aspects that can be studied in the laboratory are well understood. Nuclear reactions are such quantities that can be partly measured in the laboratory. These reactions influence the nucleosynthesis of the elements in the Big Bang as well as in all objects formed thereafter, and control the associated energy generation and evolution of stars. Since 20 years LUNA (Laboratory for Underground Nuclear Astrophysics) has been measuring cross sections relevant for hydrogen burning in the Gran Sasso Laboratory and demonstrated the research potential of an underground accelerator facility. Unfortunately, the number of reactions is limited by the energy range accessible with the 400 kV LUNA accelerator. The CASPAR (Compact Accelerator System for Performing Astrophysical Research) Collaboration will implement a high intensity 1 MV accelerator at the Sanford Underground Research Facility (SURF) and overcome the current limitation at LUNA. This project will primarily focus on the neutron sources for the so-called s-process, e.g. $^{13}\text{C}(\alpha, n)^{16}\text{O}$ and $^{22}\text{Ne}(\alpha, n)^{25}\text{Mg}$, and lead to unprecedented measurements compared to previous studies.

Frank Strieder
South Dakota School of Mines and Technology

Date submitted: 09 Jan 2015

Electronic form version 1.4