Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

A compact, high-efficiency charged-particle spectrometer for studies of stellar nucleosynthesis and kinetic implosion physics at OMEGA and the NIF[1] G.D. SUTCLIFFE, E. ARMSTRONG, J.A. FRENJE, M. GATU JOHNSON, C.K. LI, L.M. MILANESE, R. SIMPSON, C. WINK, H. SIO, F.H. SEGUIN, R.D. PETRASSO, MIT, A. ZYLSTRA, LANL, T.C. SANGSTER, LLE, H.-S. PARK, R. BIONTA, LLNL — A compact and highly efficient magnet-based spectrometer (called MOS, for Mini Orange Spectrometer) has been designed for measurements of energy spectra of low-energy protons and alphas in experiments at the OMEGA laser facility and the National Ignition Facility (NIF). The MOS brings a much needed capability to these laser facilities, able to measure charged-particle spectra with high accuracy and high energy resolution at energies <5 MeV for yields <5x10^8. High efficiency is accomplished by maximizing the solid angle. The MOS enables studies of low-probability stellar nucleosynthesis reactions like the ^{3}He+^{3}He reaction, which is part of the solar proton-proton chain. It will also enable other basic science experiments, including studies of stopping power in ICF-relevant plasmas, astrophysical shocks and kinetic physics. The optimization of the MOS design utilized simulated magnetic fields and particle tracing with the software COMSOL. Performance requirements of the MOS system, including desired detection efficiencies and energy resolution, are discussed.

[1]This work was supported in part by LLE, the U.S. DoE and LLNL.

F.H. Seguin
MIT

Date submitted: 05 Aug 2016 Electronic form version 1.4