APR17-2016-020020

Abstract for an Invited Paper
for the APR17 Meeting of
the American Physical Society

Feshbach Prize: New Phenomena and New Physics from Strongly-Correlated Quantum Matter

JOSEPH A. CARLSON, Los Alamos National Laboratory

Strongly correlated quantum matter is ubiquitous in physics from cold atoms to nuclei to the cold dense matter found in neutron stars. Experiments from table-top to the extremely large scale experiments including FRIB and LIGO will help determine the properties of matter across an incredible scale of distances and energies. Questions to be addressed include the existence of exotic states of matter in cold atoms and nuclei, the response of this correlated matter to external probes, and the behavior of matter in extreme astrophysical environments. A more complete understanding is required, both to understand these diverse phenomena and to employ this understanding to probe for new underlying physics in experiments including neutrinoless double beta decay and accelerator neutrino experiments. I will summarize some aspects of our present understanding and highlight several important prospects for the future.