

Fall 2019 Colloquium

Department of Physics & Astronomy, TAMU-Commerce

Oct 31, Thursday, 4-5 PM in Science Building 127

(coffee and cookies will be served at 3:50 PM)

Nuclear Physics

Negative-mass Hydrodynamics

Dr. Michel Forbes

Washington State University



Dr. Michel McNeil Forbes has worked in a variety of fields of physics, starting at UBC in Vancouver BC where he worked on aspects of cosmology at the QCD phase-transition, including a model for quark anti-matter nuggets explaining dark-matter and baryogenesis. He obtained his Ph.D. from MIT working with Frank Wilczek and Krishna Rajagopal on aspects of high-density matter in neutron stars, and related properties of superfluids in cold atom systems. After post-docs at UW in the nuclear theory group, as a directors fellow at Los Alamos National Laboratory, and a research assistant professor at UW in the Institute for Nuclear Theory (INT), he is now an assistant professor at WSU and affiliate professor at UW where he works on problems related on superfluid dynamics in cold

atoms, quantum turbulence, nuclear structure, LIGO, and astrophysics.

More information about Dr. Forbes' research can be found at

<https://physics.wsu.edu/people/faculty/michael-forbes/>

Abstract

The idea of negative inertial mass is quite counter intuitive: for example, if pushed, an object with negative mass will accelerate towards the pushing force rather than in the direction of the push. While such bizarre objects likely do not exist in the vacuum, one can coax rubidium atoms to behave as if they have negative effective mass using lasers to setup a so called spin-orbit coupled Bose-Einstein condensate (SOC BEC). In this talk I will discuss some properties of these systems, which have been created at WSU, such as how shockwaves propagate in a system with negative effective mass.