Department of Physics and Astronomy

Physics & Astronomy Colloquium

Presents

Gabriel Wlazłowski

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Tuesday, September 5, 2017
4:10 pm, Webster Room 17

"Towards accurate description of non-equilibrium dynamics in superfluid Fermi systems: status and challenges"

Superfluidity is a generic feature of various quantum systems at low temperatures. It has been experimentally confirmed in many condensed matter systems, in 3He and 4He liquids, in nuclear systems including nuclei and neutron stars, in both fermionic and bosonic cold atoms in traps, and it is also predicted to show up in dense quark matter. The time dependent densityfunctional theory (TDDFT) is, to date, the only microscopic method which allow to investigate fermionic superfluidity far from equilibrium. I will review recent applications of TDDFT to superfluid Fermi systems, including induced fission, nuclear reactions, dynamics of nuclear matter in neutron stars, dynamics of topological excitations in ultracold atomic clouds. These studies were possible due to utilization of a local formulation of the superfluid TDDFT that is particularly well suited for massively parallel implementation for top-tier supercomputers. Finally, delivery in the near future of a pre-exascale supercomputers will allow for studies of the quantum turbulence phenomenon in fermionic systems.

Please meet our guest speaker and share in refreshments,
3:45-4:10 p.m. in the foyer on floor G above the lecture hall

Host: Dr. Michael Forbes