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Fermion Dynamics from Gross-Pitaevskii–like Equations MICHAEL FORBES, Institute for Nuclear Theory, University of Washington, RISHI SHARMA, TRIUMF — The dynamics of condensed fermions (i.e. the Unitary Fermi Gas) play a key role in understanding a range of physical systems, from dynamics in rotating traps of cold atoms, to explaining pulsar glitches in neutron stars. Density functional theory (DFT) provides a powerful tool for modeling these dynamics, but unfortunately, simulating even a few vortices requires the use of leadership class computing. This talk will address the efficacy of using modified Gross-Pitaevskii (GP) like equations to model the dynamics of Fermi systems. These GP-like equations are significantly easier to solve, yet still capture much of the relevant physics. We shall advocate an approach of using fermionic DFT to adjust the form of the modified GP-like equations, and then using the latter to model more complicated phenomena beyond the capability of the fermionic DFT. The dynamics of vortices pinned on defects will serve as an example.

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