Abstract Submitted
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Thermal and quantum fluctuations effects on the vortex matter in Fe-based superconductors with naturally-grown and engineered pinning landscapes[1] LEONARDO CIVALE, OSCAR AYALA VALENZUELA[2], BORIS MAIOROV, JEEHOON KIM, Los Alamos National Laboratory — Vortex pinning and dynamics in Fe-based superconductors is at least as complex as in oxide superconductors. Clean single crystals may have very simple pinning landscapes dominated by a single type of defects and low critical current density (J_c). In contrast, thin films frequently show much higher J_c arising from mixed pinning landscapes containing both uncorrelated and correlated disorder. On top of these features in as-grown samples, the pinning landscape can be effectively engineered by irradiation or by addition of non-superconducting second phases. A somewhat surprising characteristic of the vortex matter in Fe-based superconductors is that it tends to show large fluctuations effects similar or even larger than oxide HTS, such as fast flux creep and extended liquid phases. This is the case even in compounds where simple estimates based on the value of the Ginzburg number would suggest that fluctuation effects should be much smaller. I will present studies of vortex matter in Fe-based superconductors with naturally-grown and engineered pinning landscapes, and discuss the influence of thermal and quantum fluctuations and the characteristics of the vortex liquid phases.

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