Vortex Pinning in Iron-based Superconductors

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***Abstract*— In this contribution, I shall address the interplay between different vortex pinning mechanisms and the multi-band nature of iron-based superconductors, how this gives rise to the anisotropies of the critical current density, and how this anisotropy can be used to extract information of the anisotropy of characteristic of superconductivity such as the coherence length. Elementary flux pinning mechanisms, notably related to doping of the iron-based materials and different occurring point defects will be discussed. I shall then use the simplest approach in which the multi-band character expresses itself through anisotropies of the coherence length and the penetration depth. From this, expressions for the different critical current densities and their dependence on the angle of the magnetic field can be derived in both the limit of strong vortex pinning by extended point defects, and weak pinning by dense atomic–sized point defects. The approach will be illustrated using data on the LiFeAs material. I shall also seize the opportunity to reflect on the impact of vortex pinning and vortex dynamics on the structure of the vortex ensemble and the vortex matter phase diagram, such as this can be measured through critical current density measurements and neutron scattering experiments.**

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