

# 凝縮系物理学ゼミナール

## Condensed Matter Seminar

Date: 13:30-15:00, Wednesday, 25 May 2022

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Title: Vortex lattice melting line in superconductors with paramagnetic pair breaking

Speaker: Dai Nakashima (Condensed Matter Theory Group)

### Abstract:

Recent experiments on the Iron-based superconductor FeSe in a high magnetic field have suggested the presence of both the fluctuation-induced vortex liquid regime and a Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) vortex lattice. To get a general picture on the magnetic phase diagram in type II superconductors with strong superconducting (SC) fluctuation and strong paramagnetic pair-breaking (PPB) such as FeSe, the vortex lattice melting curve  $H_m(T)$  is theoretically investigated in the situations where a FFLO state is expected to occur. In general, PPB tends to narrow the vortex liquid regime intervening between  $H_{c2}(T)$  and  $H_m(T)$ . In particular, the vortex liquid regime is found to rapidly shrink upon entering, by cooling, the temperature range in which the FFLO state with a periodic modulation parallel to the magnetic field is stable in the mean field theory. Based on the present results, the high field SC phase diagrams of FeSe in the parallel and perpendicular field configurations are discussed.

### Reference:

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