

Field direction dependence of the flux line lattice (FLL) structure in CeCoIn₅

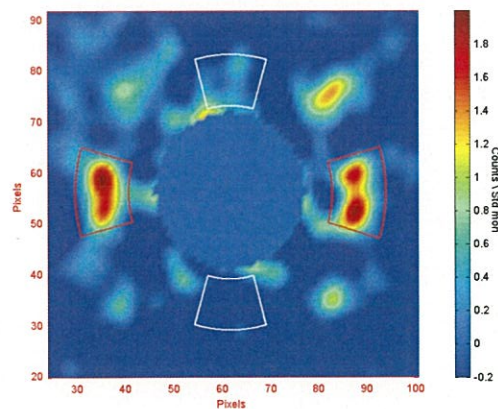
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A Heavy-fermion superconductor CeCoIn₅ has been attracted many researchers since various experimental results have suggested that the “Fulde-Ferrell-Larkin-Ovchinnikov (FFLO) state” might appear in the low- T and high- H corner of its H - T phase diagram [1-5]. Although any experiments could not verify the FFLO phase directly, neutron diffraction experiments have revealed that the system shows a spin density wave (SDW) order and that magnetic form factor of the FLL shows an abrupt increase as the field approach its upper critical field due to strong Pauli paramagnetic effects. To further investigate the nature of this material, after a long remodeling process of Small Angle Neutron Scattering (SANS) instrument V4, at HZB Germany, we restarted our measurements on field direction dependence of the FLL structure in CeCoIn₅. Then this is the 3rd experiment at V4 for this purpose. Figure 1 shows our sample mosaic used and figure 2 shows a typical scattering pattern from the FLL state in CeCoIn₅. Now we are analyzing data and plan to compare the results with 'hairy ball' theorem reported by Mark Laver & Edward. M. Forgan. (*Nature Communications* 1, Article number: 45) Travel expenses were supported by General User Program for Neutron Scattering Experiments, Institute for Solid State Physics, The University of Tokyo (proposal no. 15560), at JRR-3, Japan Atomic Energy Agency, Tokai, Japan. We really appreciate this support since we could not perform this project without it.



Top : Sample mosaic of CeCoIn₅.



Right : FLL pattern observed at 4T and with the field 42 degree away from the c -axis toward the $[110]$ axis.