



Contribution ID: 12

Type: Poster

TISANE: AC Coil Setup for Kinetic Neutron Scattering

Thursday, 6 June 2019 17:33 (1 minute)

We present the design and characterization of a newly built AC coil setup for TISANE measurements at the small angle scattering instrument SANS-1 at MLZ in Garching. The setup is based on an existing 2.2 T HTS magnet and a modified CC type cryostat. The new setup can generate a static magnetic field B_{stat} of 2.2 T superpositioned by an AC magnetic field B_{AC} in orthogonal and parallel orientation with respect to B_{stat} at base temperatures of $T_{base} = 3 - 5$ K. The magnitude of B_{AC} ranges from 25 mT for static fields to 1.2 mT at a frequency of 10 kHz. The whole setup can be positioned such that B_{stat} is either parallel or orthogonal to the neutron beam. Special attention is given to the design process of the AC coil and the choice of material for the cryostat modification. The design process was supported and optimized by FEM-simulations. Measurements of the static magnetic field at different coil separations and currents and the frequency dependence of the magnetic field for different radiation shields and configurations are presented and agree well with FEM-simulations.

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Session Classification: Poster Session