SMALL ANGLE SCATTERING OF POLARIZED NEUTRONS FROM HIGH TEMPERATURE AND MAGNETIC SUPERCONDUCTORS IN MIXED STATE

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A spin flip scattering of polarized neutrons by vortex lattice in high temperature and uniaxial magnetic superconductors is predicted [1, 2]

We carry out calculations for different high temperature superconductors in the wide region of applied magnetic field to show how this phenomenon can be used in the study of

magnetic flux distribution in the vortex lattice. Near the first critical field the polarization of diffracted neutrons depends on both the applied magnetic field and its orientation with respect to anisotropy axis of a superconductor. It is the region in which the vortex lines are not parallel to the applied magnetic field. Beyond this region of the applied fields the polarization depends only on the angle between the vortex lines and anisotropy axis. The polarization reaches a minimum at the angle which depends on a ration of London penetration depths of superconductor.

In magnetic uniaxial superconductor the minimum of polarization as a function of the angle between the vortex lines and anisotropy axis is found as well. Much more intensity of diffracted neutrons is expected in comparison with that for nonmagnetic superconductors.

The depolarization of neutrons passing through the superconductor is considered as well. Near the first critical field there is the change polarization due to its rotation about the vortex line direction, whereas the depolarization is very small beyond this region.

REFERENCES

1. *Zhuchenko N.K.* //Physica C, 1993. V.206. P.233.
2. *Zhuchenko N.K.* //Physica C, 1993. V.206. P.133.