ANISOTROPY OF THE NEUTRON SCATTERING ON THE $Mn_{0.71}Ni_{0.29}$ ALLOY

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9.7 cm

The subject of the present experiment is a test of the spatial anisotropy of the neutron scattering in the $Mn_{0.71}Ni_{0.29}$ alloy. The earlier study of the neutron scattering in the FCC $Mn_{0.62}Ni_{0.38}$ demonstrated the pronounced uniaxial anisotropy both in the static and dynamical part of the generalized susceptibility. The anisotropy axis is parallel to the scattering-vector reduced to the paramagnetic Brillouin zone. However, no significant anisotropy of the spin-wave scattering was found neitherin other Mn-Ni alloys nor in FCC Mn-Fe alloys . The present extension of our study on the Mn-Ni alloys aims to find the concentration dependence of the anisotropy. Our main result for the paramagnetic phase of the $Mn_{0.71}Ni_{0.29}$ alloy is that the correlation length is bigger for the direction parallel to the anisotropy axis than for the perpendicular one by a factor of 1.5. The spin-wave velocity observed at 15 K is higher for the direction parallel to the anisotropy axis than that for the perpendicular direction by a factor of 1.2. The same factors for the $Mn_{0.62}Ni_{0.38}$ alloy were: 2 - for the correlation length in the paramagnetic phase and 1.4 - for the spin wave velocity. Within the Heisenberg model the spatial anisotropy is predicted to be more pronounced for the less extended magnetic interaction. Our results indicate that magnetic interactions are less extended for higher Ni concentration.

13.4 cm

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