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Neutron diffraction studies of compounds based on MnGe under high pressure at low temperatures in high magnetic fields

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The creation of extreme conditions on the sample by means of high external pressure together with changes in the magnetic field and temperature allows to obtain the comprehensive amount of experimental data for a detailed description of the internal properties of materials.

We investigated the $\text{Mn}_{1-x}\text{Fe}_x\text{Ge}$ compounds, which crystallize into a noncentrosymmetric cubic structure of the B20 type, with Small-angle neutron scattering (SANS) under applied pressure and high magnetic field. In order to perform the corresponding study, the nonmagnetic high-pressure cell was developed that fits the standard sample position and allows to increase the pressure up to 12 kbar with possibility of further improvement up to 25 kbar. The ambient pressure experiment was performed at SANS-1 at FRM-II, while the high-pressure experiment was fulfilled at SANS diffractometer PA20, which was located at LLB, Saclay, France.

On the basis of the obtained experimental data, it becomes possible to estimate the real influence of a change of the cell constant, without taking into account the change in the electron concentration, on the evolution of the field-temperature phase diagram for compound under investigation.

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