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Analytical approach to neutron scattering on solitons in low dimensional systems IRINA BARIAKHTAR, APS/Boston College, YAROSLAV NAZARENKO, Brown University — It is well known that neutron scattering, along with x-ray scattering, allows for the study of condensed matter system structures. Recently, it was revealed that in magnetic materials some nonlinear formations such as solitons of the topological type of excitation - kinks, solitons with zero topological charge - breathers, and solitons with linear excitation, analogous to spin waves, may arise. In this paper, we present the polarized neutron scattering approach for the study of such formations in magnetic materials. The formulas for the cross sections of scattering in the low-dimensional systems with solitons were obtained. We have presented the calculations for kink type solitons. Similar calculations can also be presented for breather-type solitons. We have shown that the study of neutron polarization after scattering provides for the possibility of gathering information on the static and dynamic properties of the solitons and allows for restoring of the magnetic momentum distribution in the solitons. We hope that such calculations will stimulate the formulation of a series of experiments where solitons can be experimentally observed.

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