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Phase transitions in relaxors as seen by neutron scattering SEVERIAN GVASALIYA, Laboratorium für Festkörperphysik, ETH Hönggerberg, Zürich, Switzerland, ROGER COWLEY, Clarendon Laboratory, Physics Department, Oxford University, UK, SERGEY LUSHNIKOV, Ioffe Physico-Technical Institute, St Petersburg, Russia, BERTRAND ROESSLI, Laboratory for Neutron Scattering, Paul Scherrer Institut, Villigen PSI, Switzerland, GELU-MARIUS ROTARU, Empa, Laboratory for Protection and Physiology, St Gallen, Switzerland — Relaxors have a broad temperature and frequency-dependent peak in the dielectric permittivity that is not necessarily linked to a structural phase transition. A model relaxor is $PbMg_{1/3}Nb_{2/3}O_3$ (PMN) doped with $PbTiO_3$ (PT). We report neutron studies of the low-energy spectra of (1-x)PMN-xPT crystals. Apart from phonons which do not show a soft mode, there are two components of the diffuse scattering: one is quasi-elastic (QE) and the other static. The energy width of the QE scattering decreases as the peak of the susceptibility is approached. The static component behaves like an order parameter. In the crystals that become ferroelectric it is maximal at the ferroelectric phase transition, but in PMN it steadily increases on cooling. We discuss previously reported and new results in terms of a random-field model of the cubic crystal.

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