MAS16-2016-000035

Abstract for an Invited Paper
for the MAS16 Meeting of
the American Physical Society

Neutron Studies of Excitations in Relaxor Ferroelectrics

PETER GEHRING, National Institute of Standards and Technolgoy

Neutron scattering has played a seminal role in elucidating fundamental concepts in ferroelectrics, such as the existence of soft modes and how they relate to the dielectric permittivity. Similarly, our current understanding of the complex physics of relaxors has benefited significantly from studies based on a wide variety of neutron scattering methods. This is primarily due to the neutrons ability to probe spatial and temporal correlations simultaneously in condensed matter spanning many orders of magnitude in distance and time, which is arguably the most powerful aspect of the neutron scattering technique. For this reason, neutron scattering is ideally suited to studies of relaxors, which not only exhibit relaxational effects over an enormous frequency range, but which also display competing short and long-range spatial correlations. Nevertheless, after more than a half century of research, no unified picture of the relaxor lattice dynamics has emerged. Disagreement about the nature of the mode coupling in relaxors has spawned divergent models of the soft mode, while the strong diffuse scattering has been attributed either to a relaxational mode or to a local, harmonic mode. Here I will briefly review the excitations in relaxors studied using various neutron methods.