(*x, x, x*) retain their □110□-type in-plane displacements; the displacements of the remaining atoms undergo reorientation to fulfill the conditions imposed by the k = (0, 0, 0) mode. The former group of displacements defines the direction of the appearing tetragonal axis.

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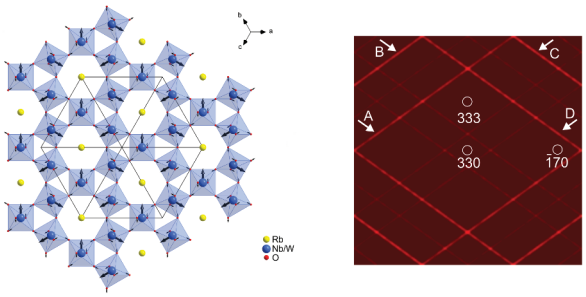

Figure 1. Scheme of atomic displacements in one of {111} $RbNbWO_6$ planes (left side) which reproduce the experimental diffuse scattering pattern. On the calculated section of the reciprocal space (right side) extinct diffuse streaks are marked with letters A – D and their directions are indicated by arrows.

Keywords: short-range order, X-ray diffuse scattering, phase transition, group theory

MS24-O2 Diffuse scattering experiments with relaxor ferroelectics: probing complexity of primitive cubic perovslite

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Lead-based relaxors are puzzling ferroelectrics with centrosymmetric perovskite-like average structure and frequency dependent maximum of dielectric permittivity. The core of polar response in relaxors is local deviations from centrosymmetric structure due to a structural disorder; diffuse scattering is therefore expected to provide valuable information on the disorder. Here we focus on the experimentation and discuss diffuse scattering data for PMN relaxor collected as a function of temperature, pressure, and electric field. Different experimental problems and ways we present diffuse scattering are discussed. The anisotropy and shape of diffuse scattering can be successfully parameterized with a combination of two contributions. First term mimics thermal diffuse scattering, the corresponding microscopic glass-like realization corresponds to a fluctuation regime. The second term is located very near Bragg nodes and develops with cooling; it presumably represents frozen atomic displacements pinned by the static compositional disorder. The latter effect indicates an emergence of numerous long-lived states that is a hallmark of a dipole glass. The pressure does suppress polar correlations in a specific glass-like relaxor state, and above 40 kbar new non-polar phase becomes stable, while electric field leads to relatively small changes in the shape and intensity of diffuse scattering.

Keywords: diffuse scattering, relaxor, disorder, synchrotron radiation