

MS27-01 | COMBINING DIFFUSE AND INELASTIC SCATTERING IN THE EXPLORATION OF PHASE TRANSITIONS

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Diffuse x-ray scattering (DS) and inelastic x-ray scattering (IXS) complement each other in the studies of lattice dynamics and static or slowly changing correlated disorder. Fast mapping of the reciprocal space with high momentum resolution allows the identification of regions of interest, which can be further explored in more detail by energy-resolved IXS experiment. Unambiguous attribution of DS features as inelastic or (quasi)elastic can immediately provide valuable insights on the behaviour of the system; rapid and efficient screening of temperature (pressure, field, etc.) response becomes available.

We present the results obtained at ESRF by tandem use of IXS and diffraction/diffuse scattering beamlines for the selection of first- and second-order phase transitions related to the phonon softening or displacement disorder. The considered examples include the ferroic perovskites and strongly correlated systems with charge density waves, where electron-phonon coupling is essential.