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## *Incommensurate magnetic ordering and magnetoelectric coupling of BiFeO3*

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BiFeO3 is arguably one of the most interesting multiferroic materials with both ferroelectric and magnetic transition above room temperature. Moreover, it has one of the highest polarization values, near 90 microC/cm2. The other interest lies in the cycloid magnetic structure with an unusually long-period of 620 Å. One of the key questions when it comes to the fundamental understanding of BiFeO3 is how the structure evolves as a function of temperature, especially across the cycloid transition, and whether there is any structural evidence of the most sought-after magnetoelectric coupling. The other principal question concerns with a full spin Hamiltonian necessary to describe the cycloid structure and the other fascinating physical properties. In order to answer these two questions, we have carried out high-resolution structural and dynamics studies using both neutron and synchrotron facilities on powder and single crystal samples. In this talk, we will highlight the structural evidence of the magnetoelectric coupling and high-field quenching of the cycloid above 20 Tesla from high-precision neutron scattering studies [1a,b,c]. We will also present inelastic neutron scattering data, from which we succeeded in establishing the full spin Hamiltonian [2-3].

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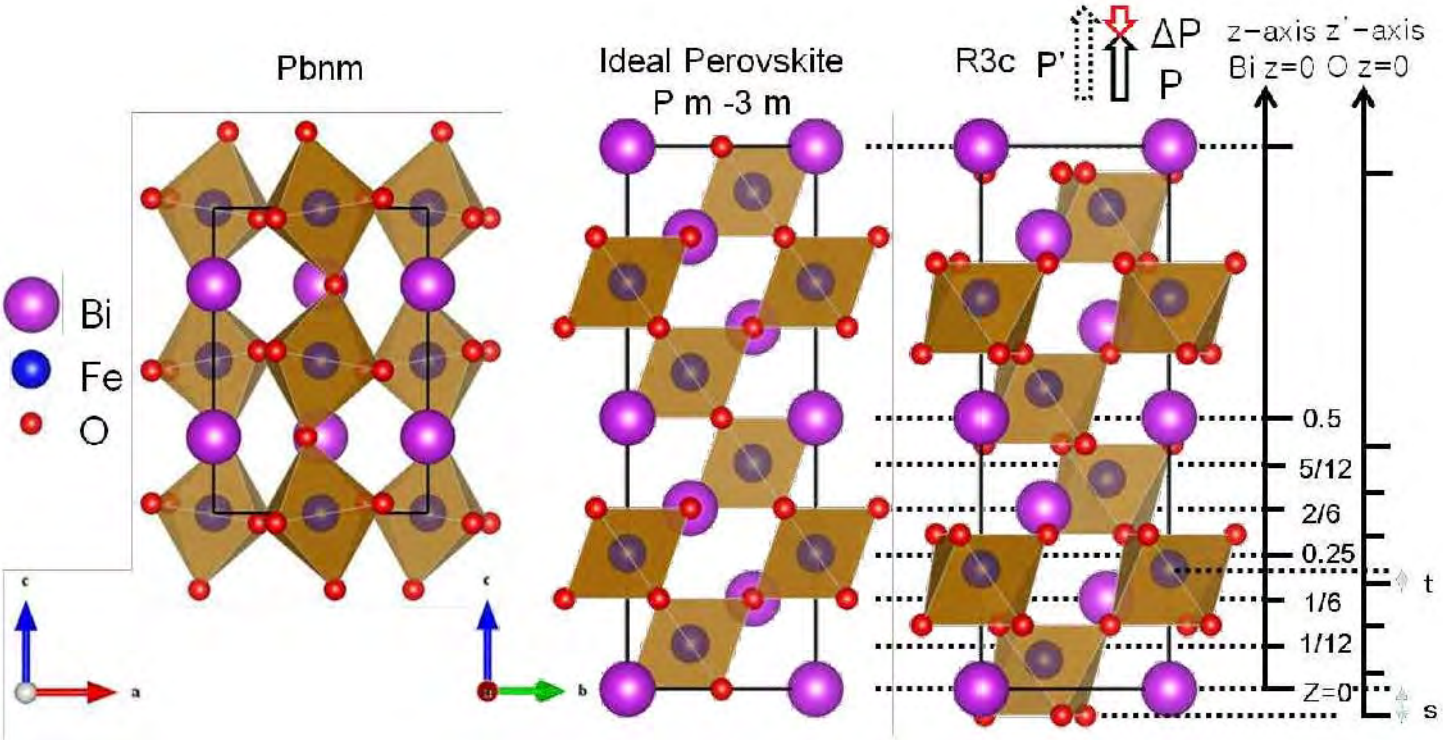


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