SPIN BRANCHING INTO THE REALM OF FERROELECTRICITY

Abstract

The discovery of novel properties, effects or microscopic mechanisms in modern materials science is often driven by the quest for the coexistence and/or coupling of several functional properties into a single compound. Within this framework, I will focus on the interplay between spin and dipolar degrees of freedom in two different materials classes: 1) multiferroics (showing a coexistence of long-range magnetism and ferroelectricity), where a specific non-centrosymmetric spin (or charge or orbital) order induces a spontaneous ferroelectric polarization; 2) ferroelectric semiconductors, where the combination of ferroelectricity and spin-orbit coupling induces a Rashba-like k-dependent spin-splitting in the electronic structure, establishing an intimate link between spin-texture and electric polarization.