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**Electric Field Tuning of the Rashba Effect** SHANAVAS VEEDU, SASHI SATPATHY, Univ of Missouri - Columbia — The Rashba effect describes the momentum-dependent spin splitting of the electron states at a surface or interface. The control of the Rashba effect by an applied electric field is at the heart of the proposed Rashba-effect-based spintronics devices for manipulating the electron spin. We studied how the Rashba SOI at the polar perovskite surfaces and interfaces can be tuned by manipulating the two-dimensional electron gas (2DEG) by an applied electric field. We saw that the Rashba SOI originates from the first few layers near the surface and it therefore can be altered by drawing the 2DEG to the surface or by pushing the 2DEG deeper into the bulk with an applied electric field. We carried out a comprehensive density-functional study of the recently-discovered polar $KTaO_3$ surface both with and without an applied electric field. y-discovered polar $KTaO_3$ surface both with and without an applied electric field. The strength of the Rashba effect depends intricately on the surface induced asymmetry of the Ta(d) states as well as the strength of the spin-orbit interaction, which is unraveled from the study of a tight-binding model Hamiltonian to describe the Rashba effect.

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