



Tunable 2D Multiferroic Metal $\text{Cu}(\text{CrSe}_2)_2$

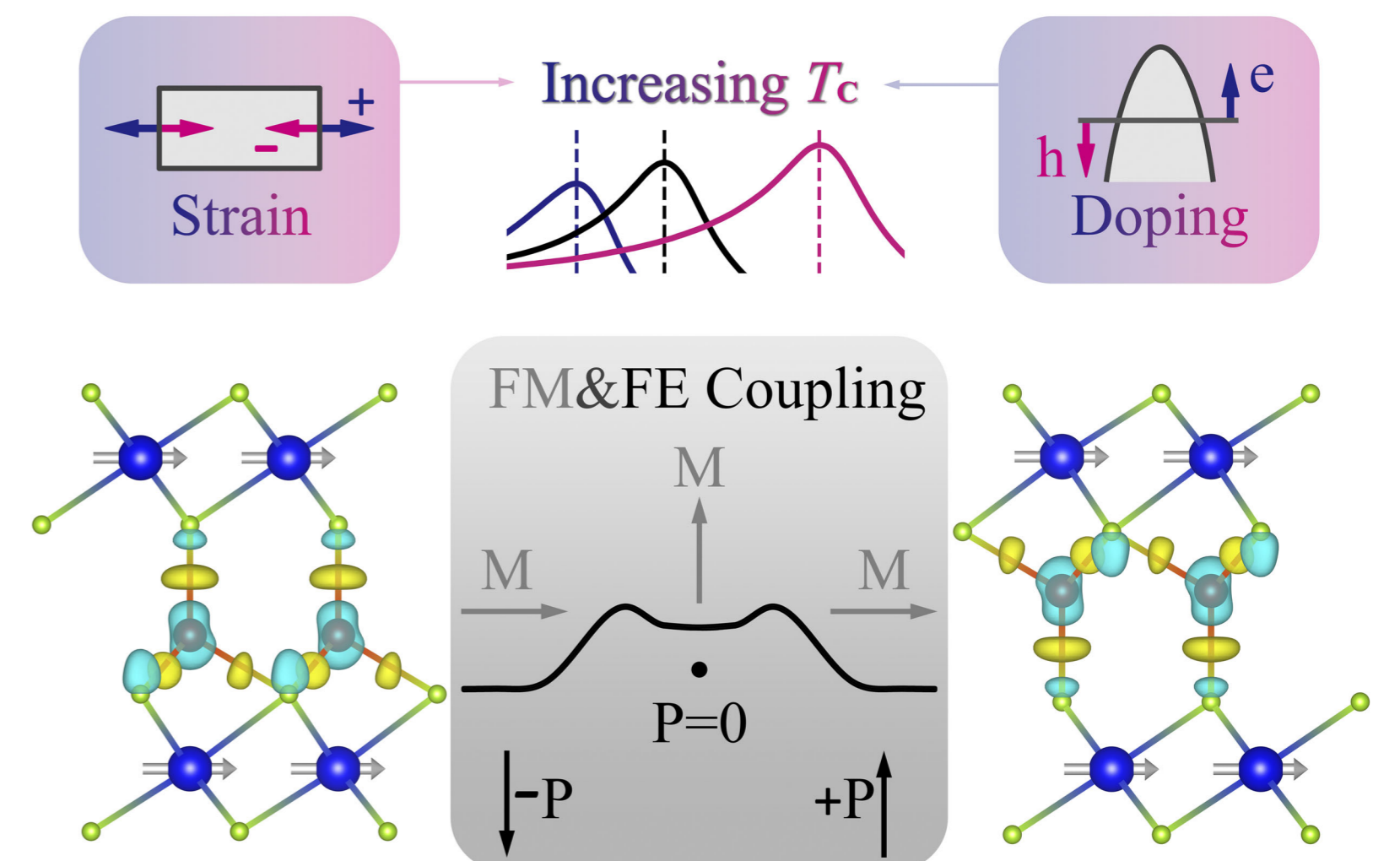
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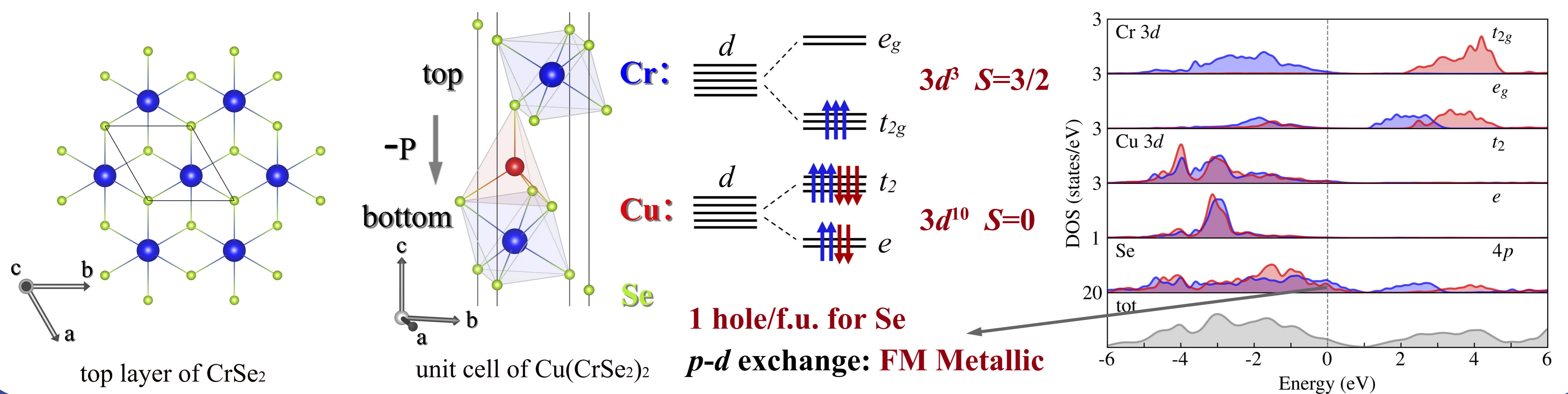
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Introduction

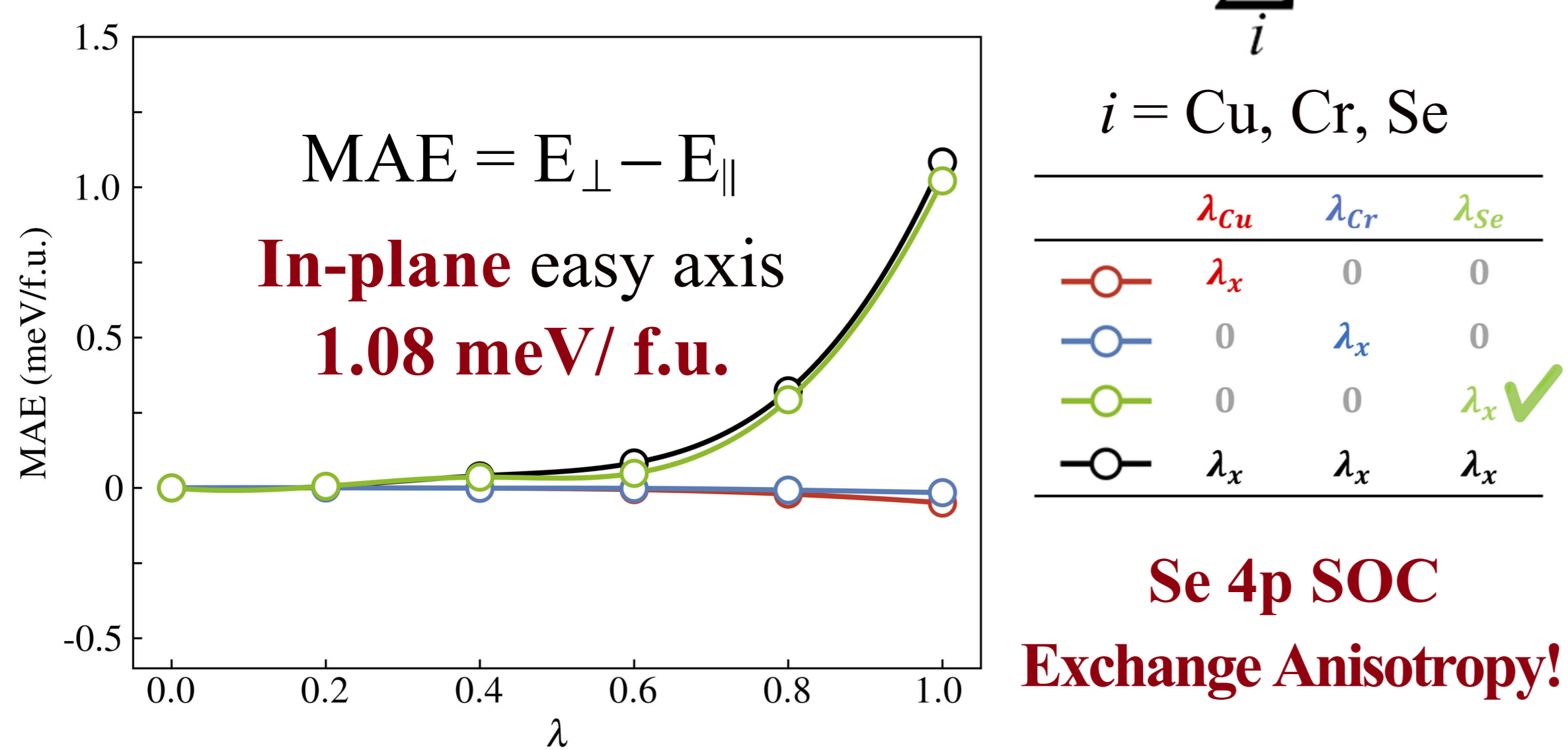
In this work, we systematically investigate the combined electronic structure, ferromagnetic (FM) properties, ferroelectric (FE) properties, and the resulting magnetoelectric coupling properties of the $\text{Cu}(\text{CrSe}_2)_2$ monolayer, along with the effects of carrier doping and strain. Our data support the two-dimensional multiferroic metal $\text{Cu}(\text{CrSe}_2)_2$ monolayer as a viable candidate for advanced multifunctional electronic devices.



Electron structure

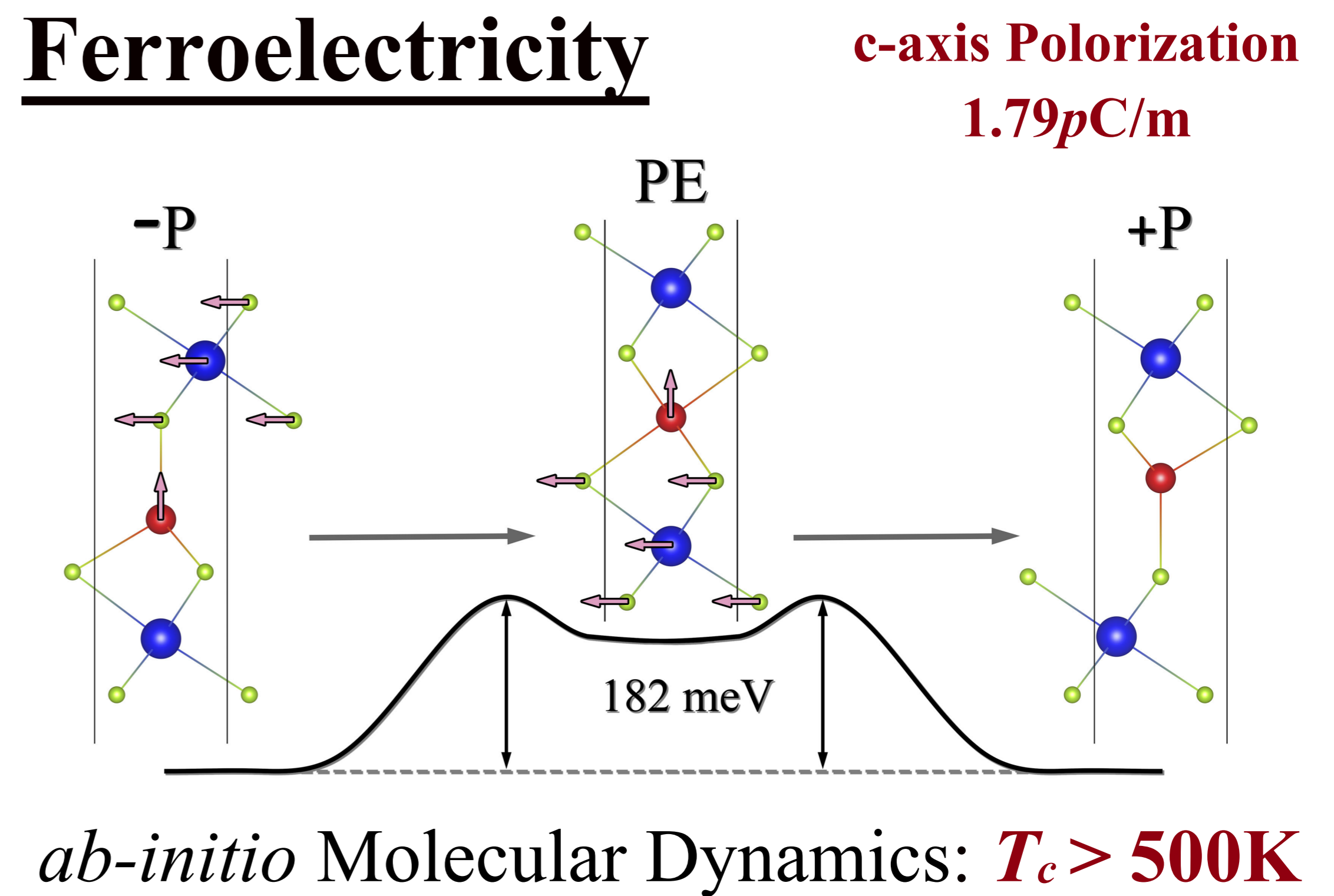


Magnetism

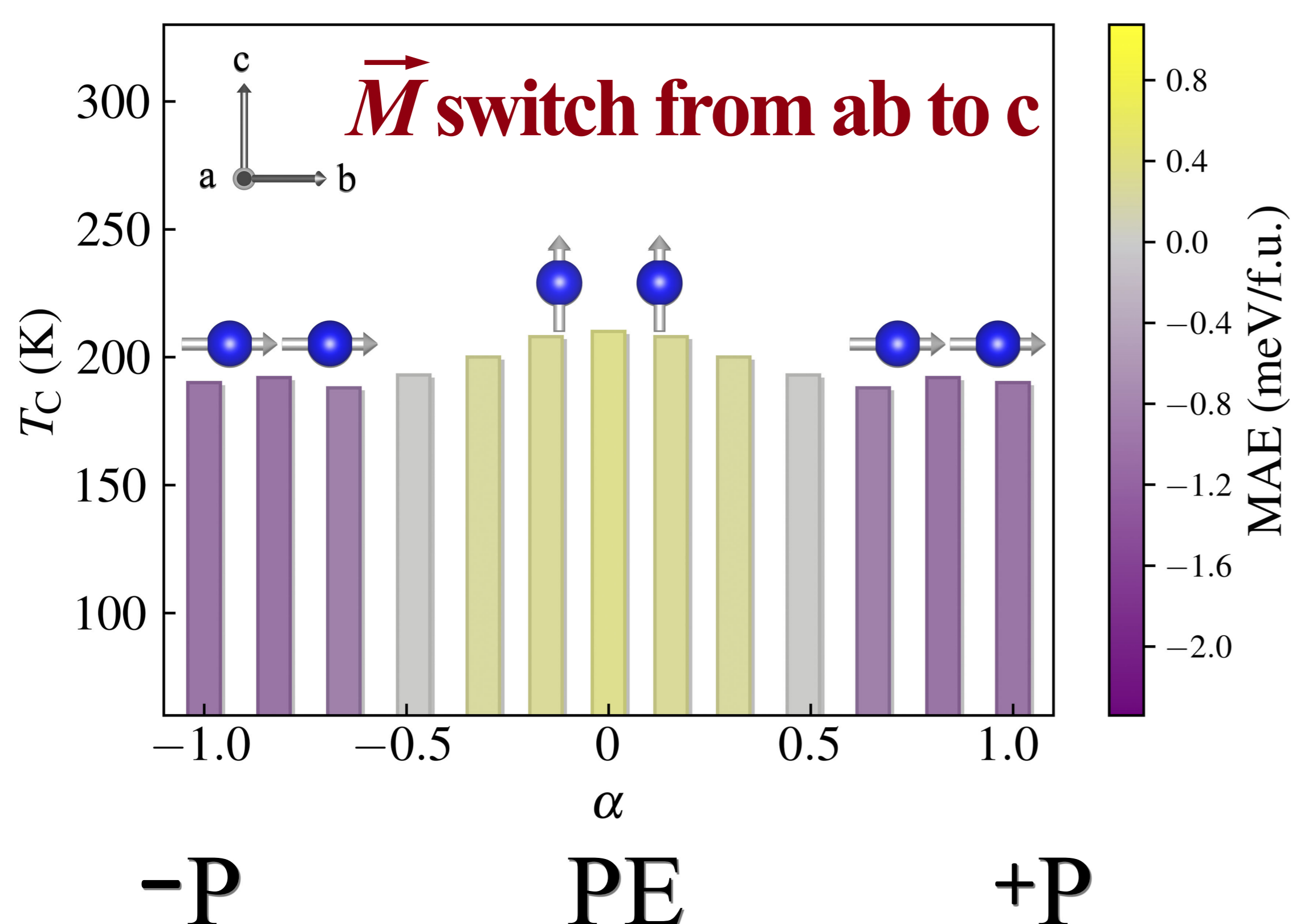


FM ground state, Monte Carlo: $T_c = 190\text{K}$

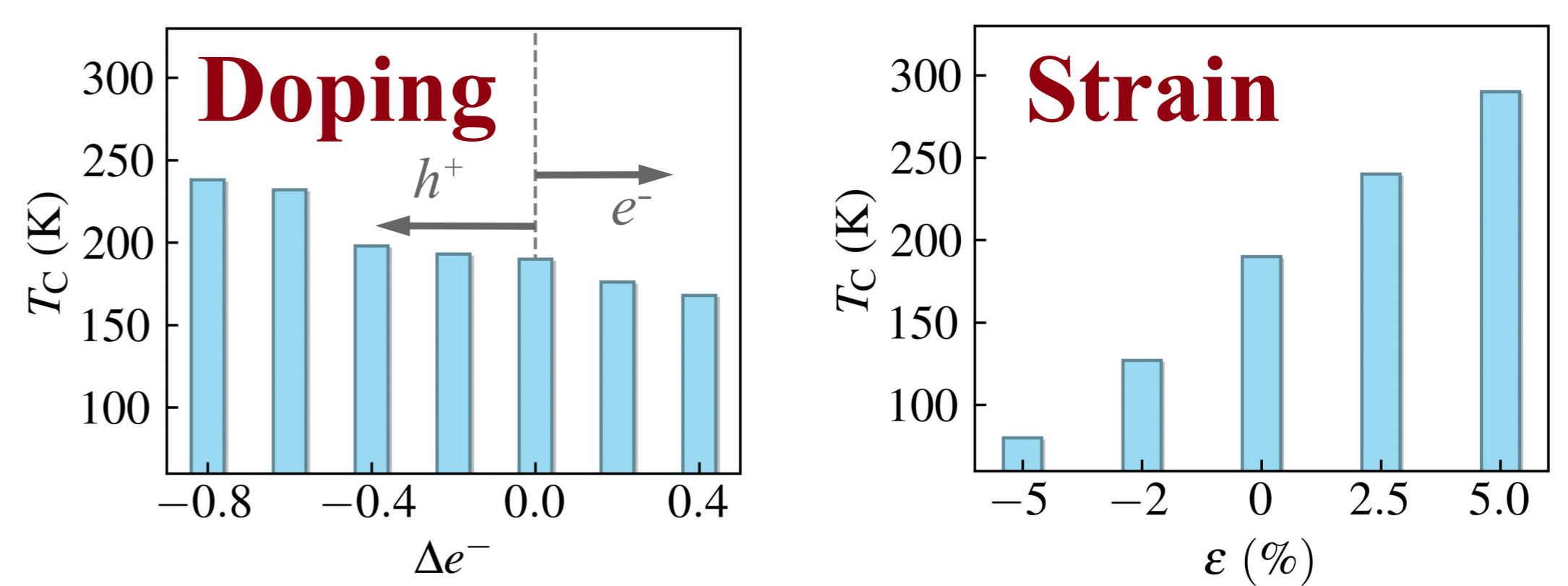
Ferroelectricity



Magnetoelectric Coupling



Controlling



Conclusion

Charge State: Cu^+ , Cr^{3+} , 1hole/f.u. for Se^{2-} (metallic)
FM: In-plane easy axis: exchange anisotropy, $T_c = 190\text{K}$
FE: c-axis Polarization: 1.79pC/m , $T_c > 500\text{K}$
M&E Coupling: \vec{M} switch from ab to c upon FE-PE transition
TC enhancement: Hole Doping & Tensile Strain