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Experimentally tuning the ground state of $BaFe_2As_2$ by orbital differentiation[1] PRISCILA ROSA, University of California at Irvine, CRIS ADRIANO, THALES GARITEZI, University of Campinas, TED GRANT, ZACHARY FISK, University of California at Irvine, RICARDO URBANO, PASCOAL PAGLIUSO, University of Campinas — The role of structural parameters in layered systems, such as iron pnictides/chalcogenides (Fe-Pn/Ch), cuprates and heavy fermions, has become crucial for the understanding of their properties. In this talk, I will discuss this subject using a combination of macroscopic and microscopic techniques to study $Ba_{1-x}Eu_xFe_{2-y}M_yAs_2$ single crystals (M = Co, Cu, Mn, Ni, and Ru). Interestingly, a close connection arises between the spin-density wave (SDW) phase suppression and local distortions in the structure. Furthermore, these changes are reflected at the Fermi surface by an increase of anisotropy and localization of the Fe $3d$ bands at the FeAs plane. Our results suggest that such increase in the planar (xy/x^2-y^2) orbital symmetry seems to be a favorable ingredient for the emergence of superconductivity in this class of materials.

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