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Electronic Self-Organization in the Single-Layer Manganite $\mathbf{Pr_{1-x}Ca_{1+x}MnO_4}$[1] FENG YE, Oak Ridge National Laboratory, SONGXUE CHI, Univ. of Tennessee, Konxville, JAIME FERNANDEZ-BACA, Neutron Scattering Science Division, ORNL, ADRIANA MOREO, ELBIO DAGOTTO, Materials Science and Technology Division, ORNL, JEFF LYNN, NIST Center for Neutron Research, ROLAND MATHIEU, YOSHIO KANEKO, YOSHI TOKURA, University of Tokyo, PENGCHENG DAI, University of Tennessee, Knoxville — Using neutron scattering technique, we have investigated the doping evolution of the magnetic correlations in the single-layer manganite $Pr_{1-x}Ca_{1+x}MnO_4$ away from x = 0.5, where the CE-type commensurate antiferromagnetic (AF) structure is stable. Short-range incommensurate spin correlations develop as the system is electron doped (x < 0.5), which coexist with the CE-type AF order. This suggests that electron doping induces an inhomogeneous electronic self-organization, where commensurate AF patches with x = 0.5 are separated by electron-rich domain walls, a different scenario than in the perovksite $Pr_{1-x}Ca_xMnO_3$. Instead of forming novel charge or magnetic order state, textured electronic structures are established in the doped layered manganites. These structures are strikingly similar to the stripe order in the superconducting cuprates and this work establishes important connections between two families of the strongly correlated electron system in terms of electronic self-organization and spin incommensurability.

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