Probing intertwined orders in cuprate superconductors

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Doping holes into the correlated-insulator state of CuO_2 planes frustrates the antiferromagnetic order and leads to an inhomogeneous state that can take the form of charge and spin stripes. The reduced dimensions of the spin stripes lead to the development of a singlet-triplet gap, while the interaction of the charge carriers with this environment can yield electron pairing. Rather than acting as a competing order, this intertwining of spin and charge correlations can result in superconductivity [1]. We have probed these intertwined orders with neutron [2] and x-ray [3] scattering and with transport measurements [4]. I will discuss the perspective on high-temperature superconductivity provided by these studies.

References:

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