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Superfluid density and competing orders in d-wave superconductors SERGEI SHARAPOV, Department of Physics and Astronomy, McMaster University, JULES CARBOTTE — We derive expressions for the superfluid density ρ_s in the low-temperature limit $T \to 0$ in d-wave superconductors, taking into account the presence of competing orders such as spin-density waves, is-pairing, etc. Recent experimental data for the thermal conductivity and for elastic neutron scattering in $La_{2-x}Sr_xCuO_4$ suggest there are magnetic field induced anomalies that can be interpreted in terms of competing orders. We consider the implications of these results for the superfluid density and show in the case of competing spin-density wave order the usual Volovik-like $\sqrt{H}$ depletion of $\rho_s(H)$ is replaced by a slower dependence of ρ_s on the applied magnetic field H. We show that it is crucial to include the competing order parameter in the self-consistent equation for the impurity scattering rate.

Jules Carbotte
Department of Physics and Astronomy, McMaster University

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