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Superconducting phase diagram of itinerant antiferromagnets ASTRID TRANUM ROEMER, Niels Bohr Institute, University of Copenhagen, DK-2100 Copenhagen, Denmark, ILYA EREMIN, Institut für Theoretische Physik III, Ruhr-Universität Bochum, D-44801 Bochum, Germany, PETER J. HIRSCHFELD, Department of Physics, University of Florida, Gainesville, USA, BRIAN M. ANDERSEN, Niels Bohr Institute, University of Copenhagen, DK-2100 Copenhagen, Denmark — We investigate the formation of Cooper pairs in systems with itinerant antiferromagnetic (AF) order. Our theory is a generalization of earlier studies of spin fluctuation mediated pairing on top of AF [1,2]. The AF order is manifested by gapless transverse spin waves as well as gapped longitudinal spin fluctuations. Both branches contribute to the Cooper pairing. We map out the superconducting gap as a function of electron doping and find a robust d-wave gap on the electron pockets in the anti-nodal regions with no nodes at the Fermi surface. Close to the critical doping of onset of AF order we observe a highly non-monotonic form of the superconducting gap due to enhancements at the "hot spots." In this doping regime we explore the presence of p- and f-wave triplet gaps competing with the d-wave solution [3].

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[2] D. M. Frenkel and W. Hanke, Phys. Rev. B 42, 6711 (1990).
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