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**Crossover from non-Fermi liquid to Fermi liquid behavior and the superconducting dome in heavy electron systems**[1] PEDRO SCHLOTTMANN, Florida State University — A nested Fermi surface and the remaining interaction between the carriers after the heavy particles are formed give rise to itinerant antiferromagnetism. We consider an electron and a hole pocket, separated by a wave vector $\mathbf{Q}$, and Fermi momenta $k_{F1}$ and $k_{F2}$, respectively.[2] The order is gradually suppressed by increasing the mismatch of the two Fermi momenta and a QCP is obtained as $T_N \to 0$. For critical mismatch of the Fermi vectors (tuned QCP) the specific heat over $T$ increases as $-\ln(T)$ as $T$ is lowered[1,2] and the linewidth of the quasi-particles is linear in $T$ and $\omega$. With increasing nesting mismatch and decreasing temperature the specific heat and the linewidth display a crossover from non-Fermi liquid ($\sim T$) to Fermi liquid ($\sim T^2$) behavior. If in addition the vector $\mathbf{Q}$ is commensurate with the lattice (Umklapp with $\mathbf{Q} = \mathbf{G}/2$), pairs of electrons can be transferred between the pockets. To avoid the QCP this process may lead to superconductivity and a superconducting dome above the quantum critical point. We investigate the conditions under which such a dome arises.[3]

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[2]P. Schlottmann, Phys. Rev. B **59**, 12379 (1999).
[3]P. Schlottmann, Phys. Rev. B **89**, 014511 (2014).

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