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Luttinger's theorem and Phase Transitions in Bose-Fermi mixtures STEPHEN POWELL, Yale University, SUBIR SACHDEV, Harvard University, HANS PETER BUCHLER, University of Innsbruck — A mixture of bosonic and fermionic atoms with a Feshbach resonance between the two can exhibit a range of phases as the energy of a fermionic bound state is varied. In each uniform phase a generalized statement of Luttinger's theorem can be made regarding the two Fermi surfaces, one associated with the atomic fermion and one with the bound-state molecule. The various phases can then be characterized by their different Luttinger constraints, which also depend on the presence or absence of a bosonic condensate. Interesting parallels can be drawn between this system and two others: the transition to the fractionalized Fermi liquid in Kondo lattice models, and fermion-pair condensation in the presence of mismatched Fermi surfaces.

Stephen Powell
Yale University

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