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**Competing phases in Bose-Fermi mixtures of ultracold atoms in optical lattices** LUDWIG MATHEY, Harvard University, SHAN-WEN TSAI, UC Riverside, ANTONIO CASTRO-NETO, Boston University — We study mixtures of ultracold bosonic and fermionic atoms, confined to a two-dimensional lattice, with a numerical functional renormalization group (RG) method. The method is an extension of the RG approach to interacting fermions<sup>1</sup> which also takes into account couplings of the fermions to bosonic modes.<sup>2</sup> We obtain the phase diagram of the system for the limit of large bosonic phonon velocity in comparison to the Fermi velocity. The renormalization group method provides the value of the gaps of the various phases, as well as the subdominant orders and the short range fluctuations.

<sup>1</sup>R. Shankar, Rev. Mod. Phys. 66, 129 (1994).

<sup>2</sup>S.-W. Tsai, A. H. Castro Neto, R. Shankar, and D. K. Campbell, Phys. Rev. B 72, 054531 (2005).

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