Abstract Submitted
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Alternating-Sign S-Wave Superconductivity in Single-Layer FeSe from the Local Moment Limit[1] JOSE RODRIGUEZ, California State University at Los Angeles — We obtain the exact low-energy spectrum of two mobile electrons roaming over a 4 by 4 lattice of iron atoms governed by a t-J model for a monolayer of FeSe. Each iron atom contains the minimum d_{xz} and d_{yz} orbitals. The hopping parameters (t) account only for electron bands centered at wave vectors $(\pi, 0)$ and $(0, \pi)$, while the Heisenberg exchange parameters (J) imply a quantum-critical point (QCP) at half-filling that separates a commensurate spin-density wave (cSDW) at strong Hund coupling from a hidden-order antiferromagnet at weak Hund coupling. The hidden-order antiferromagnet has ordering wavevector (π, π). After tuning the Hund coupling near the QCP, we find an S^{+-} ground state and a D^{+-} excited state that are separated in energy from the edge of a quasi-particle continuum. Both bound states alternate in sign between electron pairs at cSDW momenta and electron pairs at emergent electronic structure with zero 2D momentum. Exact calculations for a single electron with the same t-J model parameters find that the emergent electronic structure at zero 2D momentum moves off the Fermi level as Hund coupling weakens below the QCP. We therefore suggest that the above S^{+-} groundstate describes Coopers pairs in a monolayer of FeSe.

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