

Abstract Submitted  
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**Incommensurate spin resonance in URu<sub>2</sub>Si<sub>2</sub>.**<sup>1</sup> JIAN XIN ZHU, ALEXANDER BALATSKY, ATHANASIOS CHANTIS, HARI DAHAL, LANL, DAVID PARKER, NRL — The nature of the hidden order (HO) in URu<sub>2</sub>Si<sub>2</sub> below  $T_{HO} = 17.5\text{K}$  has been a puzzle for a long time. Here we propose to search for the spin resonance as a tool to elucidate the nature of the HO. We consider inelastic neutron scattering in URu<sub>2</sub>Si<sub>2</sub> and argue that a gap in the fermion spectrum will produce an incommensurate spin resonance at  $Q^* = (1 \pm 0.4, 0, 0)$  at  $\omega_{res} = 4\text{-}6$  meV. We assume that the HO gap is due to a particle-hole condensate that connects nested parts of the Fermi surface with nesting vector  $Q^*$ . The predicted behavior of the spin susceptibility is strikingly similar to the phenomenology of resonance peaks in high- $T_c$  and heavy fermion superconductors. The energy of the resonance peak scales with  $T_{HO}$   $\omega_{res} \sim 4 k_B T_{HO}$

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