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Spin-orbit induced mixed-parity pairing in Sr_2RuO_4: a self-consistent quantum many-body analysis JOHN DEISZ, TIM KIDD, University of Northern Iowa — The unusual superconducting state in Sr_2RuO_4 has long been viewed as being analogous to a superfluid state in liquid ^{3}He. Nevertheless, calculations based on a pure odd-parity state are presently unable to completely reconcile the properties of Sr_2RuO_4. Using a self-consistent quantum many-body scheme that employs realistic parameters, we are able to model several signature properties of the normal and superconducting states of Sr_2RuO_4 such as the weak temperature dependence of the spin susceptibility below T_c. However, we find that the dominant component of the model superconducting state is of even parity and closely related to superconducting state for the high-T_c cuprates although a smaller odd-parity component is induced by spin-orbit coupling. This mixed parity pairing state provides an alternative scenario for understanding the complex phenomena measured in Sr_2RuO_4.

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