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RG Approach to Superconductivity in Sr_2RuO_4 : Multi-Band and Spin-Orbit Effects THOMAS SCAFFIDI, JESPER ROMERS, STEVEN SIMON, University of Oxford — We study the superconductivity pairing mechanism in Sr_2RuO_4 in the limit of small interaction by extending a renormalization group (RG) calculation developed by Raghu et al (Phys Rev B.81.224505) to include multi-band and spin-orbit coupling (SOC) effects. We show these effects to be crucial to discriminate between the possible order parameters. In contrast to the usual theory of an “active” gamma band with a large superconducting gap and “passive” alpha and beta bands with smaller gaps induced by a proximity effect, we obtain pseudo-spin triplet gaps of the same order of magnitude on all three bands for a large range of interaction parameters. The inclusion of SOC in the microscopic model allows us to study ab initio the breaking of degeneracy between the different d vector orientations. Implications for experiments will be discussed.

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