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On the Origin of Charge Order in RuCl3 TOM BERLIJN, Oak Ridge National Laboratory — RuCl3 has been proposed to be a spin-orbit assisted Mott insulator close to the Kitaev-spin-liquid ground state, an exotic state of matter that could protect information in quantum computers. Recent STM experiments [M. Ziatdinov et al, Nature Communications (in press)] however, show the presence of a puzzling short-range charge order in this quasi two dimensional material. Understanding the nature of this charge order may provide a pathway towards tuning RuCl3 into the Kitaev-spin-liquid ground state. Based on first principles calculations I investigate the possibility that the observed charge order is caused by a combination of short-range magnetic correlations and strong spin-orbit coupling. From a general perspective such a mechanism could offer the exciting possibility of probing local magnetic correlations with standard STM. This work was supported by the U.S. Department of Energy, Office of Science, Basic Energy Sciences, Materials Sciences and Engineering Division.

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