Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

**Anisotropy induces non-Fermi liquid behavior and nemagnetic order in three-dimensional Luttinger semimetals** IGOR BOETTCHER, IGOR HERBUT, Simon Fraser University, Burnaby, British Columbia, Canada — We illuminate the intriguing role played by spatial anisotropy in three-dimensional Luttinger semimetals featuring quadratic band touching and long-range Coulomb interactions. For sufficiently strong anisotropy, two main effects come to light. First, the three-dimensional system features an Abrikosov non-Fermi liquid ground state. Second, qualitatively new fixed points show up which describe quantum phase transitions into phases with nemagnetic orders – higher-rank tensor orders that break time-reversal symmetry, and thus have both nematic and magnetic character. In real materials these phases may be realized through sufficiently strong microscopic short-range interactions. On the pyrochlore lattice, the anisotropy-induced fixed points determine the onset of all-in-all-out or spin ice ordering of local magnetic moments.

Igor Boettcher
Simon Fraser University, Burnaby, British Columbia, Canada

Date submitted: 09 Nov 2016 Electronic form version 1.4