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Unconventional metamagnetism and orbital ordering in transition metal oxides (I)[1] CONGJUN WU, WEI-CHENG LEE, Department of Physics, University of California, San Diego, CA 92093 — We extend the study of the Fermi surface instability of the Pomeranchuk type into systems with orbital band structures, which are common features in transition metal oxides. Band hybridization significantly shifts the spectral weight of the Landau interactions from the conventional s-wave channel to unconventional non-s-wave channels, which results in anisotropic (nematic) Fermi surface distortions even with ordinary interactions in solids. The Ginzburg-Landau free energy is constructed by coupling the charge-nematic, spin-nematic, and ferromagnetic order parameters together, which shows that nematic electron states can be induced by metamagnetism. The connection between this mechanism and the anisotropic metamagnetc states observed in $Sr_3Ru_2O_7$ at high magnetic fields is studied in a multiband Hubbard model with the hybridized quasi-one-dimensional d_{xz} and d_{yz} bands.

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Congjun Wu
Department of Physics, University of California, San Diego, CA 92093

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