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**Pomeranchuk instabilities of Fermi fluids in the spin channel** KAI SUN, UIUC, CONGJUN WU, UCSB, EDUARDO FRADKIN, UIUC, SHOU-CHENG ZHANG, Stanford — We study the Pomeranchuk instabilities of the Fermi surface in the spin channel. It is shown that the instabilities will lead to two classes of the ordered phases, the $\alpha$ and $\beta$-phases, named by analogy to the superfluid $^3$He-A and B-phases. The Fermi surfaces in the $\alpha$-phases exhibit spontaneous anisotropic distortions, while those in the $\beta$-phases remain circular with non-trivial spin configurations in momentum space. The low energy excitations of the ordered phases are studied by RPA approximation. In the $\alpha$-phases, the density excitations exhibit anisotropic overdamping and the spin density excitations are nearly isotropic and underdamped at small propagating wavevectors. The $\beta$-phases shows a Lifshitz- like instability in the $p$-wave channel, and will stabilize a chiral ground state inhomogeneity.

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