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Gapless Fermi Surfaces in anisotropic multiband superconductors in magnetic field.[1] VICTOR BARZYKIN, Department of Physics and Astronomy, University of Tennessee, Knoxville, TN 37996-1200, LEV P. GOR'KOV[2], National High Magnetic Field Laboratory, Florida State University, 1800 E. Paul Dirac Dr., Tallahassee, Florida 32310 — We propose that a new state with a fully gapless Fermi surface appears in quasi-2D multiband superconductors in magnetic field applied parallel to the plane. It is characterized by a paramagnetic moment caused by a finite density of states on the open Fermi surface. We calculate thermodynamic and magnetic properties of the gapless state for both s-wave and d-wave cases, and discuss the details of the 1-st order metamagnetic phase transition that accompanies the appearance of the new phase in s-wave superconductors. We suggest possible experiments to detect this state both in the s-wave (2-H $NbSe_2$) and d-wave ($CeCoIn_5$) superconductors.

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