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Quantum phases of a two-dimensional dipolar Fermi gas GEORG BRUUN, Niels Bohr Institute, EDWARD TAYLOR, Universita di Trento — We examine the superfluid and collapse instabilities of a quasi two-dimensional gas of dipolar fermions aligned by an orientable external field. It is shown that the interplay between the anisotropy of the dipole-dipole interaction, the geometry of the system, and the p-wave symmetry of the superfluid order parameter means that the effective interaction for pairing can be made very large without the system collapsing. This leads to a broad region in the phase diagram where the system forms a stable superfluid. Analyzing the superfluid transition at finite temperatures, we calculate the Berezinskii–Kosterlitz–Thouless temperature as a function of the dipole angle.

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