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Functional RG approach to dipolar fermions in a 2D optical lattice SATYAN BHONGALE, George Mason University, LUDWIG MATHEY, NIST, ERHAI ZHAO, George Mason University, SHAN-WEN TSAI, UC Riverside — Recent trapped atom experiments are able to generate an ultra-cold gas of heteronuclear molecules with a sufficiently large dipole moment to allow for the occurrence of rich many-body physics leading to exotic quantum phases. A key role is played by the anisotropic and long range nature of the dipole-dipole interaction. We study a system of fermionic dipolar molecules in a 2D optical lattice. Previous studies for homogeneous configurations have revealed the possibility of s-wave CDW and the p-wave BCS phase. However, much remains to be understood. In our study we take an unbiased approach by following the functional RG technique. This method allows us to look at the flow of various channels as one approaches the Fermi surface in the RG sense. We find an intriguing interplay between the s-wave CDW and the p-wave superfluid phases.

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