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Ground state of a Fermi gas with tilted dipoles[1] ANTUN BALAZ, VLADIMIR VELJIC, Institute of Physics Belgrade, Serbia, ARISTEU R. P. LIMA, University for International Integration of the Afro-Brazilian Lusophony, Brazil, SIMON BAIER, LAURIANE CHOMAZ, University of Innsbruck, Austria, FRANCESCA FERLAINO, University of Innsbruck and IQOQI of Austrian Academy of Sciences, Innsbruck, Austria, AXEL PELSTER, Physics Department and Research Center OPTIMAS, Technical University of Kaiserslautern, Germany
— In the presence of an anisotropic and long-range dipole-dipole interaction, the Fermi sphere of an ultracold Fermi gas deforms into an ellipsoid. Recently, it was experimentally observed in such systems that the shape of the Fermi surface follows the rotation of the dipoles when they are tilted [1]. Here we generalize the Hartree-Fock mean-field theory of Refs. [2, 3], where the dipoles were assumed to be parallel to one of the trap axes, to an arbitrary orientation of the dipoles and obtain the ground-state Thomas-Fermi radii and momenta. The calculated angular dependence of the Fermi surface deformation shows good agreement with experimental observations. We also find that the angular dependence of the aspect ratio turns out to be a direct consequence of the dipole tilting.
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[2] F. Wächtler, et al., Phys. Rev. A **96**, 043608 (2017).
[3] V. Veljić, et al., Phys. Rev. A **95**, 053635 (2017).

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