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**Permanent polarization of small metallic particles** ANDREY SHYTOV, Brookhaven National Laboratory, MICHAEL PUSTILNIK, Georgia Institute of Technology — Electric charge density in a metal fluctuates on the spatial scale of the Fermi wavelength due to various types of disorder. These fluctuations are usually compensated in the bulk due to Coulomb interaction between electrons. However, a small metallic particle may have a non-vanishing static electric dipole moment, owing to uncompensated density fluctuations near the surface on the scale set by the screening length. We analyze these fluctuations statistically and find that the typical value of the dipole moment increases linearly with the particle size, and fluctuates strongly from particle to particle. Our results are applicable to small metallic clusters and nanocrystals.

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