

# A new approach to finding interaction force between charged macroparticles

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The problem of electrostatic interaction between charged bodies arises from studying dusty plasmas and electrolytes, molecular clusters, and extraterrestrial atmospheres [1]. A possible approach to modelling such systems is to consider a pair of charged dielectric spheres located in a homogenous dielectric medium, which allows to explain the phenomenon of attraction between like-charged macroparticles [2, 3]. However, since the net charge of an isolated ball is equivalent to a point charge located in its center, the series for the interaction force and potential may diverge due to the delta-like contribution to the charge density of the particles. In this work, we avoid such undesirable effect by considering explicit expressions for monopole terms in the electrostatic potential expansion. The approach was developed and tested when calculating the surface charge distribution on a dielectric ball interacting with another charged ball and a point-like charged particle. Results include data for the net interaction force and potential given in comparison with those obtained without separating the divergent terms. This work is supported by the Russian Foundation for Basic Research (project No. 20-32-90054).

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