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## Size is relative: When is a charged sphere small enough to be considered a point charge, and large enough to be considered a charged plane?

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A geometric parameter is derived from the bispherical coordinate system to describe geometries of electrostatic sphere-sphere interactions, such as those among water droplets and among colloidal particles. At short separation distances where the dimensions of the spheres become important, attraction can occur between two like-charged, polarizable spheres, where such attraction is not described by Coulomb's law for a pair of point charges. Taking into account the sizes of the spheres, this parameter serves as a geometric measure of how good it is to approximate the system as a pair of point charges, and it provides a geometric understanding of the system's deviation from Coulomb's law. The parameter provides a unified geometric description not only for cases of finite-sized spheres, but also for cases that involve a point charge, i.e. an infinitesimally small sphere or a charged plane, i.e. an infinitely large sphere.

### Biography

Ho-Kei Chan has developed a method of sequential deposition for constructing the densest possible cylindrical packings of equal-sized spheres. He obtained a 1<sup>st</sup> class degree in Engineering Physics (2002) from the Hong Kong Polytechnic University and a PhD in Nonlinear and Liquid Crystal Physics (2007) from the University of Manchester, followed by post-doctoral research in Hong Kong, Ireland and England. He has published in various areas of soft matter physics and physical chemistry.

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