Multi-dimensional inhomogeneity indicators and the force on uncharged spheres in electric fields

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Uncharged droplets on outdoor high-voltage equipment suffer a non-vanishing total force in non-homogeneous electric fields. Here, the model problem of a spherical test body is considered in arbitrary dimensions. A series expansion of inhomogeneity indicators is proven, which approximates the total force in local terms of the undisturbed electric field. The proof uses the ideas of generalized spherical harmonics without referring to the particular choice of the orthonormal system. The fast converging series expansion establishes a relation between the solutions of two partial differential equations on different domains.