Modeling the Kelvin polarization force actuation of Micro- and Nanomechanical systems - DTU Orbit (13/04/2019)

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Polarization forces have become of high interest in micro- and nanomechanical systems. In this paper, an analytical model for a transduction scheme based on the Kelvin polarization force is presented. A dielectric beam is actuated by placing it over the gap of two coplanar electrodes. Finite element method simulations are used to characterize the scheme and to evaluate a field correction factor, which results from simplifying the form of the electric field. The model has been shown to be valid for dielectrics with different permittivities. The presented model facilitates the design of microresonators and nanoresonators with dielectric actuation, which offers a great freedom in the choice of structural material.