Modeling the Kelvin polarization force actuation of Micro- and Nanomechanical systems

Modeling the Kelvin polarization force actuation of Micro- and Nanomechanical systems
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.

General information
State: Published
Organisations: Nanoprobes Group, NanoSystemsEngineering Section, Department of Micro- and Nanotechnology
Contributors: Schmid, S., Hierold, C., Boisen, A.
Publication date: 2010
Peer-reviewed: Yes

Publication information
Journal: Journal of Applied Physics
Volume: 107
Issue number: 5
ISSN (Print): 0021-8979
Ratings:
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.03 SJR 0.739 SNIP 0.953
Web of Science (2017): Impact factor 2.176
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 1.72 SJR 0.906 SNIP 0.977
Web of Science (2016): Impact factor 2.068
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 1.57 SJR 0.821 SNIP 0.996
Web of Science (2015): Impact factor 2.101
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.04 SJR 1.039 SNIP 1.197
Web of Science (2014): Impact factor 2.183
Web of Science (2014): Indexed yes
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.24 SJR 1.155 SNIP 1.286
Web of Science (2013): Impact factor 2.185
ISI indexed (2013): ISI indexed yes
Web of Science (2013): Indexed yes
BFI (2012): BFI-level 1
Scopus rating (2012): CiteScore 2.13 SJR 1.312 SNIP 1.291
Web of Science (2012): Impact factor 2.21
ISI indexed (2012): ISI indexed yes
Web of Science (2012): Indexed yes
BFI (2011): BFI-level 1
Scopus rating (2011): CiteScore 2.24 SJR 1.374 SNIP 1.3
Web of Science (2011): Impact factor 2.168
ISI indexed (2011): ISI indexed yes
Web of Science (2011): Indexed yes
BFI (2010): BFI-level 1