

EINLADUNG

zum Vortrag von

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Elastomers in the Electric Field: Giant-Strain Actuators and Renewable Energy Harvesting

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Dienstag, 18. Juni 2013, um 17:30 Uhr

Ort: Lise-Meitner-Hörsaal, Fakultät für Physik, Universität Wien,
1090 Wien, Strudlhofgasse 4 / Boltzmannngasse 5, 1. Stock

Barrierefreier Zugang: Boltzmannngasse 5, Lift, 1. Stock rechts über den Gang zum Hintereingang des Hörsaals

Abstract:

Dielectric elastomer actuators (DEAs) are developed for applications ranging from artificial muscles to electrically deformable lenses. Due to unique properties dielectric elastomer generators (DEGs) show promise for harvesting of mechanical energy from small to large scales. The first part of the presented work is focused on the most conspicuous feature of DEAs: giant voltage-induced deformation of actuation. The deformation of elastic membranes induced by voltage is limited to about 60% in terms of area strain by an electromechanical instability usually leading to electric failure of the device. Two methods to exceed this limit are introduced as a theoretical concept and demonstrated with experiments. The second part of the presented work is focused on DEGs, where one of the most essential and urgent challenges is to identify or design materials with ideally suited properties. Therefore a theoretical description of DEGs is established to accurately assess the aptitude of different materials. In a comparison with a commonly used acrylic elastomer, natural rubber is revealed to have favorable properties. Further experimental analysis of natural rubber suggests soft rubber generators as a low-cost and sustainable option for ocean wave energy harvesting.

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