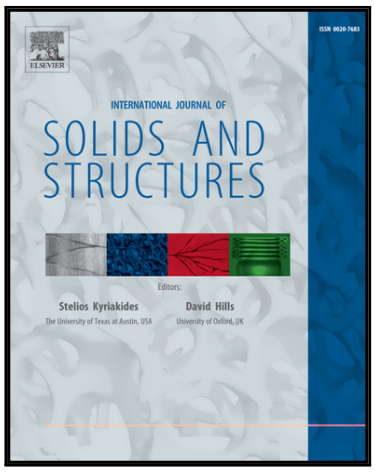

Electro-mechanical response to the harmonic actuation of the pneumatically coupled dielectric elastomer based actuators with and without load

S. Sasikala, K.T. Madhavan, G. Ramesh, S. Saggar, P. Predeep, P. Chowdhury

PII: S0020-7683(17)30058-6
DOI: 10.1016/j.ijsolstr.2017.02.003
Reference: SAS 9461

To appear in: *International Journal of Solids and Structures*

Received date: 6 January 2016
Revised date: 22 September 2016
Accepted date: 4 February 2017

Please cite this article as: S. Sasikala, K.T. Madhavan, G. Ramesh, S. Saggar, P. Predeep, P. Chowdhury, Electro-mechanical response to the harmonic actuation of the pneumatically coupled dielectric elastomer based actuators with and without load, *International Journal of Solids and Structures* (2017), doi: 10.1016/j.ijsolstr.2017.02.003

Highlights

- We have investigated the electro-mechanical response of the Pneumatically Coupled Dielectric Elastomer (PCDE) based actuators with air as an intervening medium and their important mechanical parameters are evaluated with analytical model.
- Therelationship between the theory and experimental results were presented for both simple DE and PCDE actuators under uniform pressure.
- The high voltage performances of both active and passive membranes with electric field up to 3kV under loading conditions were characterized while sweeping the frequency from 0 to 2.0 kHz.
- In this report, we have shown for the first time to the best of our knowledge that other than harmonics, several super harmonic modes were observed while using the in house developed magnetic field sensor with magnetoresistive technology. Later,the phase shift characterization near resonance were analysed for PCDE actuators.
- Therefore, this manuscript will be of great attention in the development of EAP based actuators. In future, this actuator can be used in various applications, such as frequency regulated resonator, flow control in micro air vehicle and haptics applications etc.