

## Output pressure and harmonic characteristics of a CMUT as function of bias and excitation voltage - DTU Orbit (08/11/2017)

### Output pressure and harmonic characteristics of a CMUT as function of bias and excitation voltage

The large bandwidth makes CMUT based transducers interesting for both conventional and harmonic imaging. The inherent nonlinear behavior of the CMUT, however, poses an issue for harmonic imaging as it is difficult to dissociate the harmonics generated in the tissue from the harmonic content of the transmitted signal. The generation of intrinsic harmonics by the CMUT can be minimized by decreasing the excitation signal. This, however, leads to lower fundamental pressure which limits the desired generation of harmonics in the medium. This work examines the output pressure and harmonic characteristics of a CMUT as function of bias and excitation voltage. The harmonic to fundamental ratio of the surface pressures declines for decreasing excitation voltage and increasing bias voltage. The ratio, however, becomes unchanged for bias levels close to the pull-in voltage. The harmonic limitations of the CMUT is emphasized by a maximum ratio of -12 dB between harmonics generated in the medium and total harmonics measured at 10 mm.

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