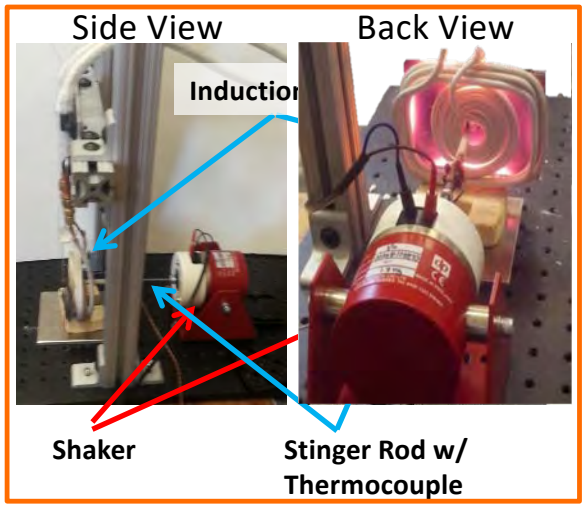
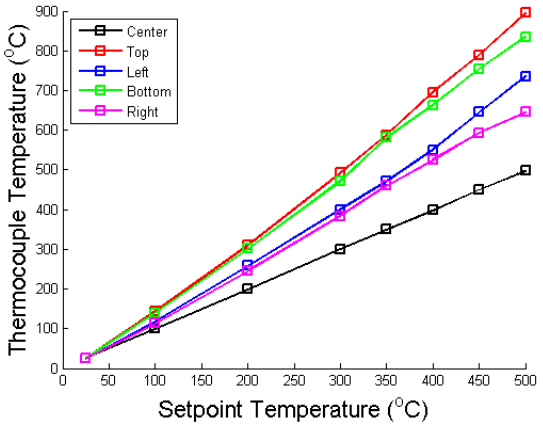
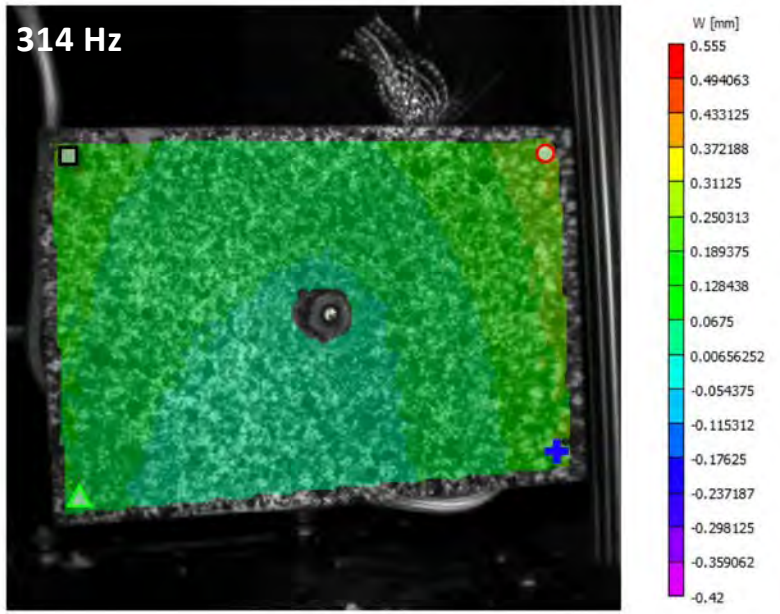
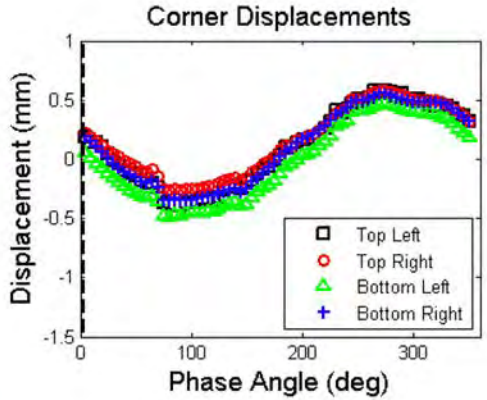
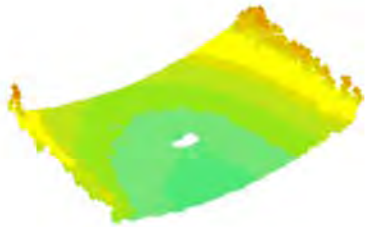
Thermoacoustic setup





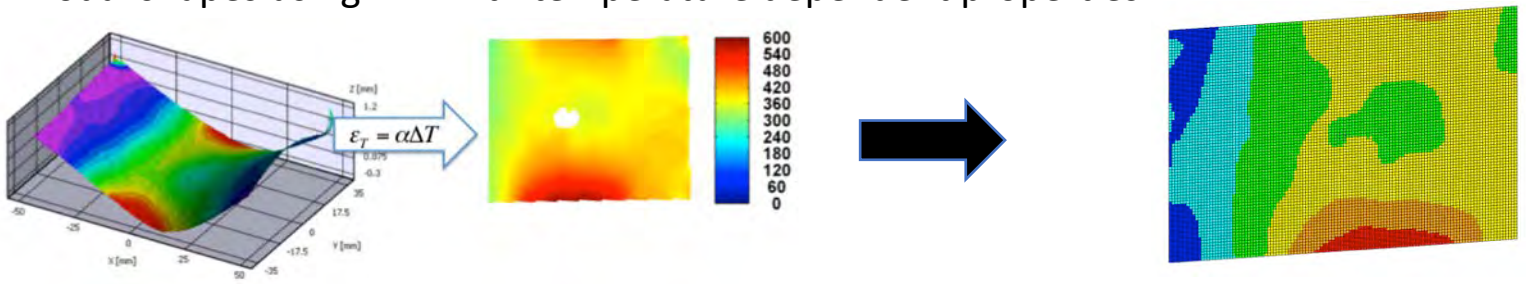




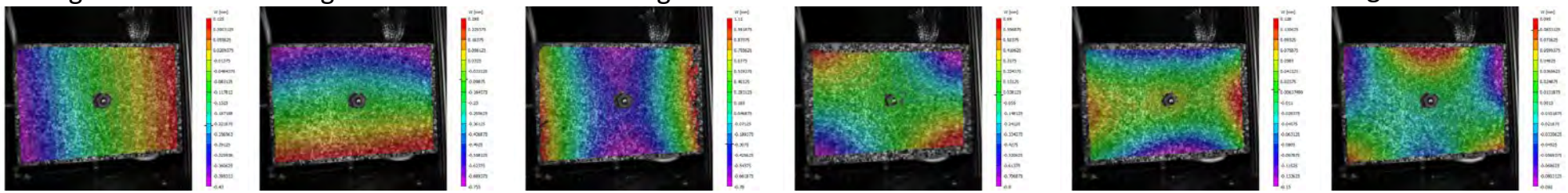


Thermoacoustic simulations

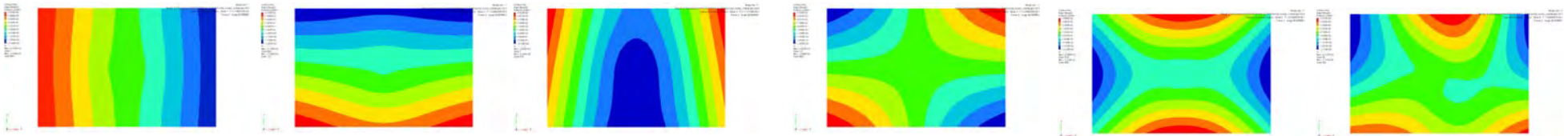
- Obtain modal shapes using FEA with temperature dependent properties:



Rigid Tilt | Rigid Tilt | Bending | Torsion | Saddle | Higher order



104/107 Hz | 140/139 Hz | 314/273 Hz | 385/295 Hz | 747/665 Hz | 879/690 Hz

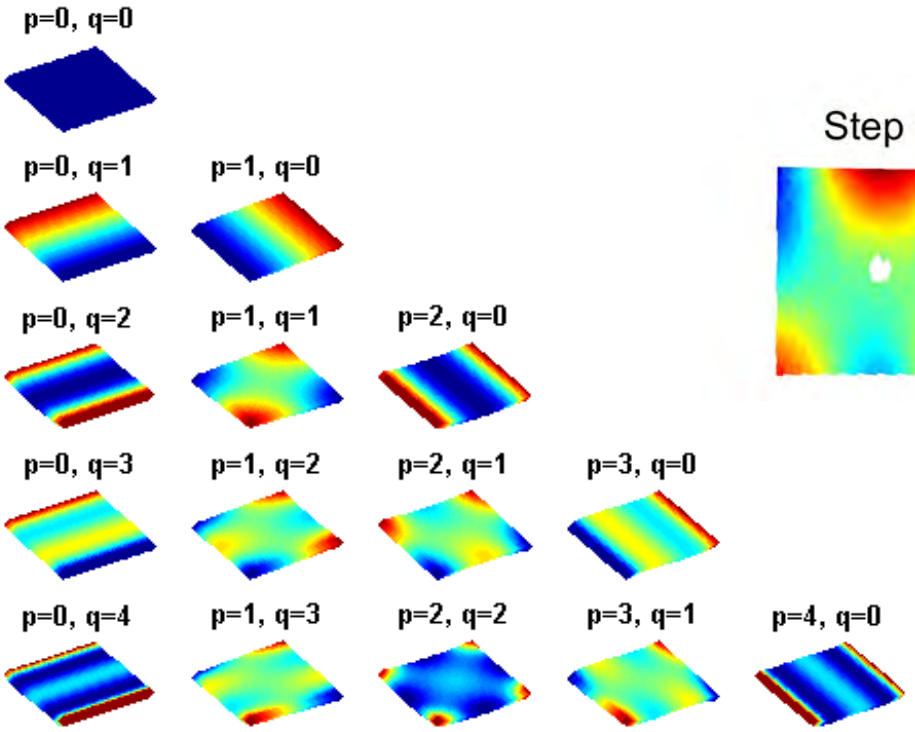


215/204 Hz | 325/309 Hz | 328/312 Hz | 484/461 Hz | 859/824 Hz | 1216/1160 Hz

Validation

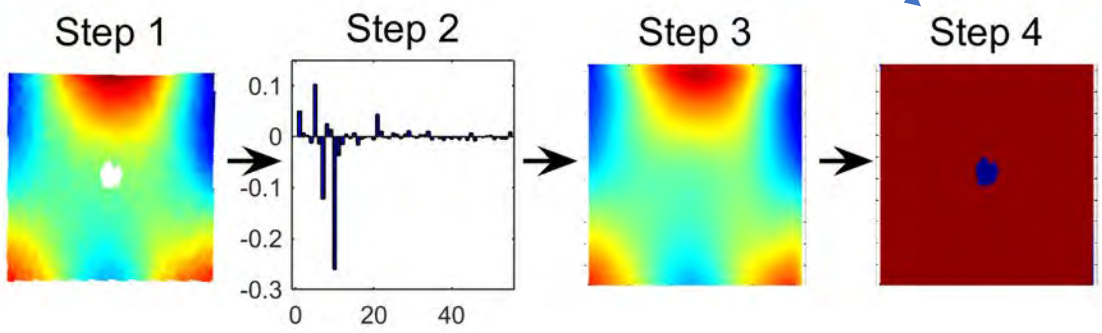
- Use Image Decomposition for validation:

Chebyshev Polynomial Kernels:



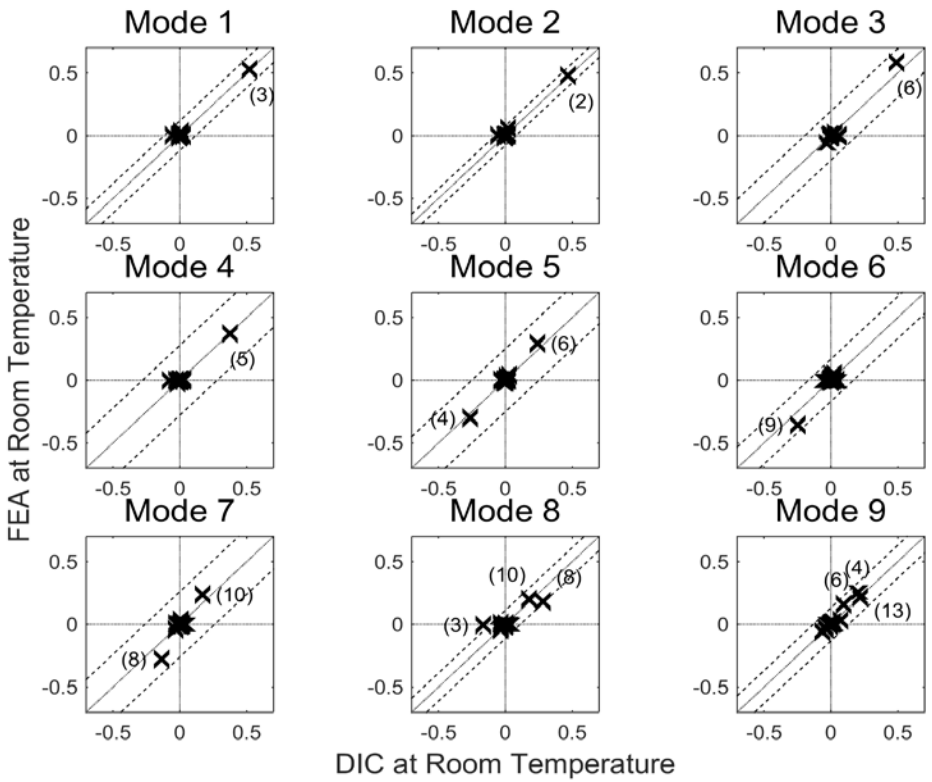
Residual:

$$u_{resid}{}^2 = \frac{1}{N}\sum_{i.j}^{N}\left(\hat{I}(i,j) - I(i,i)\right)^2$$

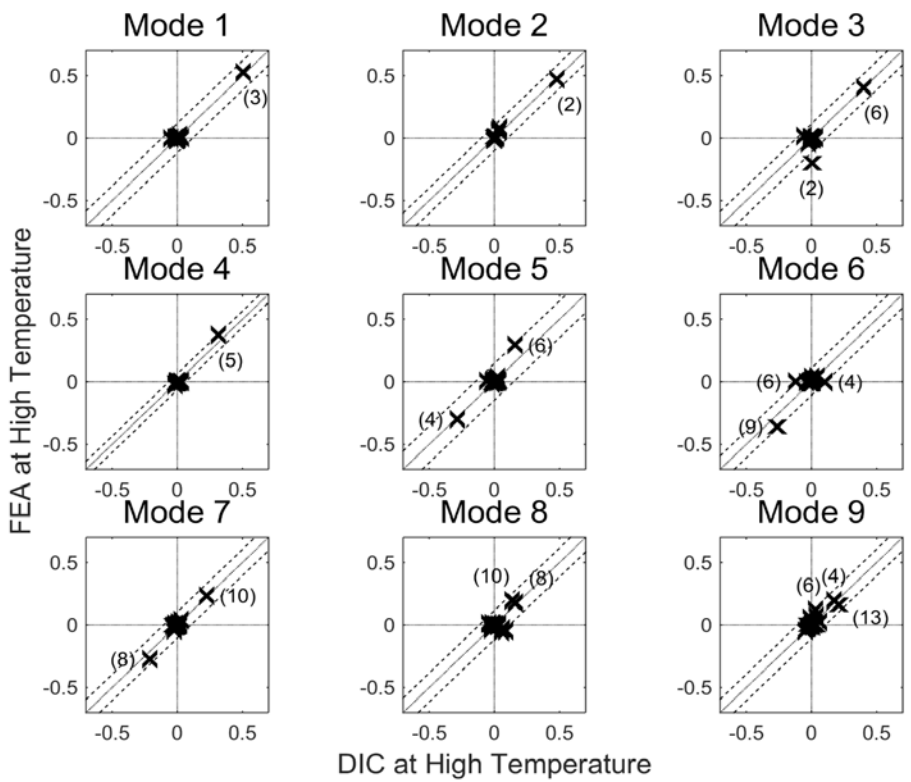


Validation

- FEA-DIC room temperature:



- FEA-DIC high temperature:

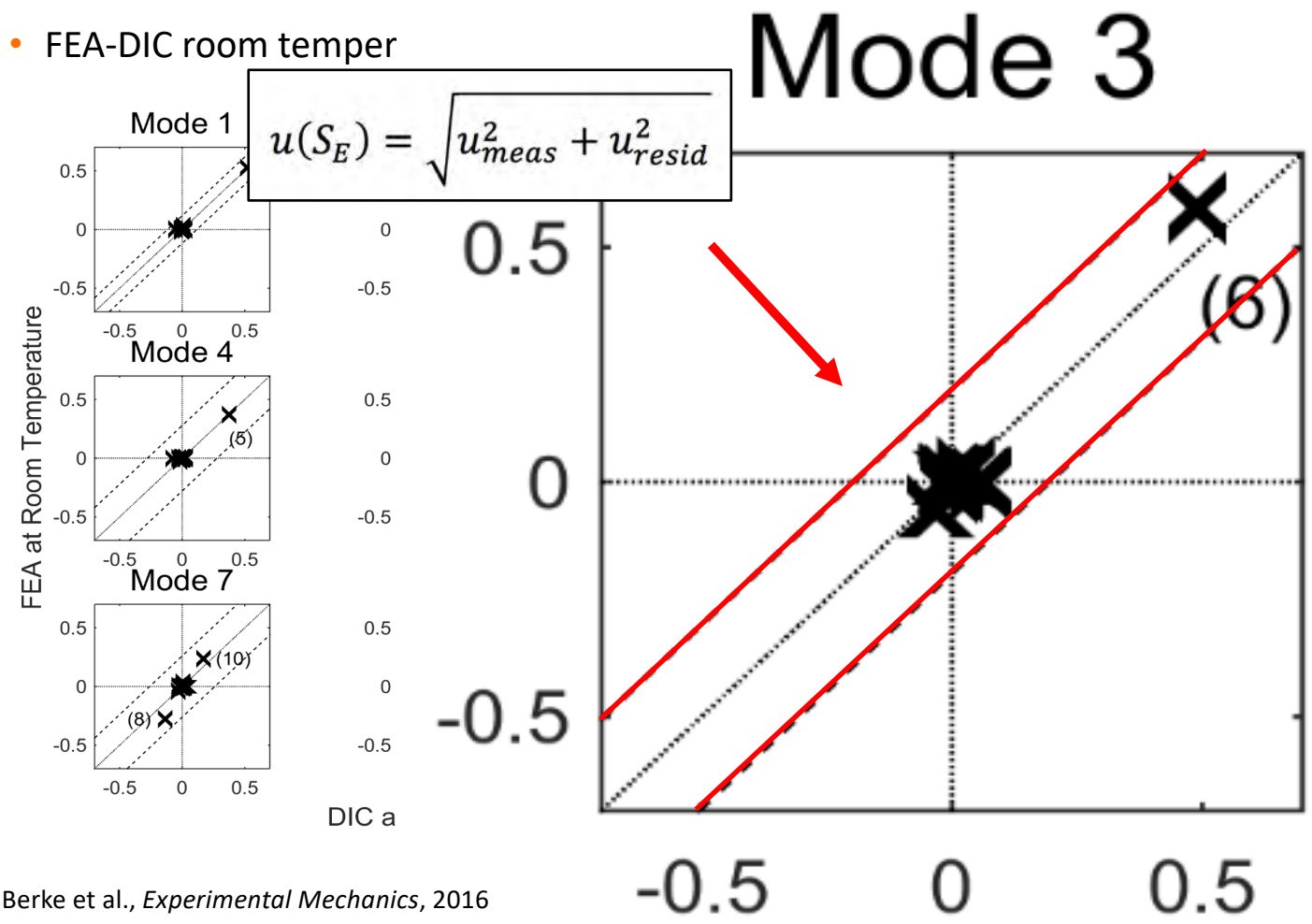


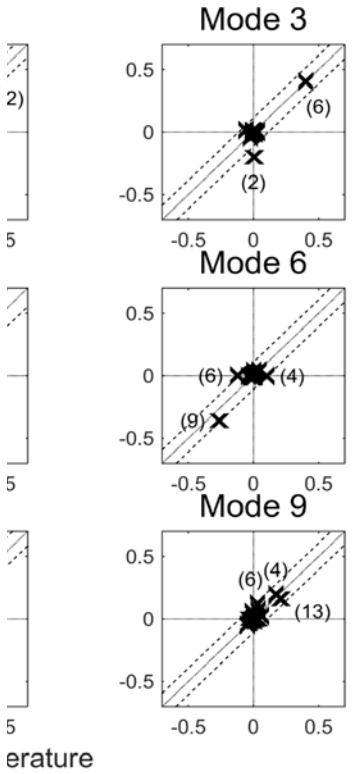
Berke et al., *Experimental Mechanics*, 2016

Validation

- FEA-DIC room temper

$$u(S_E) = \sqrt{u_{meas}^2 + u_{resid}^2}$$





Berke et al., *Experimental Mechanics*, 2016

Thanks!

Questions?

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