Optomechanical characterization of acoustic modes in a mirror

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abstract We present an experimental study of the internal mechanical vibration modes of a mirror. We determine the frequency repartition of acoustic resonances via a spectral analysis of the Brownian motion of the mirror, and the spatial profile of the acoustic modes by monitoring their mechanical response to a resonant radiation pressure force swept across the mirror surface. We have applied this technique to mirrors with cylindrical and plano-convex geometries, and compared the experimental results to theoretical predictions. We have in particular observed the gaussian modes predicted for plano-convex mirrors.