Abstract Submitted
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Damping of Acoustic Vibrations of Single Suspended Gold Nanowires and Nanoplates in Air and Water Environments[1] TODD MAJOR, University of Notre Dame, AURÉLIEN CRUT, Université Lyon 1, BO GAO, MARY DEVADAS, SHUN LO, University of Notre Dame, NATALIA DEL FATTI, FABRICE VALLÉE, Université Lyon 1, GREGORY HARTLAND[2], University of Notre Dame — The dynamics of metal nanoparticles are affected by intrinsic properties, such as crystal structure, and the viscosity and acoustic impedance of the environment. In order to separate the contribution of the environment from the dynamics of individual nanostructures, ultrafast transient absorption measurements are taken on gold nanowires suspended over trenches on the substrate in air and in water. Measurements taken in an air environment represent damping from intrinsic sources, whereas experiments in water represent a liquid environment with a well known viscosity. Quality factors of the acoustic modes from the gold nanowires were measured and match well with previous studies. The results are compared to Continuum Mechanics Calculations. The calculations show that the viscosity of water plays a minor impact on the damping of the acoustic modes. This study has been recently extended to nanoplates suspended over trenches, but the effect of viscosity has not been investigated for these materials yet.

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