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Evidence of nanobubbles in alcohol-water mixtures via production of optically-induced breathing modes in nanofluids LUAT T. VUONG, Queens College and the Graduate Center of CUNY, J.-LUIS DOMINGUEZ-JUAREZ, Queens College of CUNY, MATTHEW MOOCARME, Queens College and the Graduate Center of CUNY — When light of sufficient intensity enters a liquid close to a meniscus, thermal and mechanical effects lead to the spontaneous formation of "leaky-faucet" breathing modes. The modes are also associated with Marangoni convection. We have recently studied these modes in highly disperse solutions containing 80-nm gold plasmonic spheres (0.01mg/mL fill factor) in alcohol-water mixtures. Our investigations are focused on characterizing and understanding the dynamically-coupled light, heat, and electrical currents that are produced via the "osmotic stress" of hydration and solvation. The materials of focus are plasmonically-absorbing gold and silver nanoparticles in *alcohol-water mixtures* because it has been observed that the robust breathing modes occur in such nanofluids with extremely low-power light illumination (<50 mW). In addition to new nonlinear dynamics associated with the anomalous physical properties of alcohol-water mixtures– i.e., partial molar volume, adiabatic compressibility, heat capacity , ultrasonic speed, and light scattering– we observe evidence of the formation of nanobubbles, which agree with recent hypotheses that alcohol organic-aqueous mixtures form local 100-nm inhomogeneities described as nanobubbles.

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