Abstract Submitted
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Colloidal Particle Vibration Spectroscopy TIM STILL, MPI for Polymer Research, Mainz, Germany, GEORGE FYTAS, MPI for Polymer Research, Mainz, Germany; Univ. of Crete and FORTH, Heraklion, Greece, MAURIZIO MATTARELLI, MAURIZIO MONTAGNA, Univ. Trento, italy — Brillouin light scattering (BLS) on dry colloidal particles resolves a large number of resonance vibrations (eigenmodes),[1] allowing determining the elastic properties at meso- and nanoscale and measure (polymer) physical properties not accessible by other methods.[2] So far, only the frequencies of the different eigenmodes, labeled by the "quantum numbers" (n,l) and calculated following Lamb's 19th century approach, were taken to identify the nature of the measured signals, however leading to some ambiguities. Herein, we present the first full theoretical representation of BLS eigenmode spectra, allowing an unprecedentedly precise access to the individual colloid's thermomechanical properties.[3] A longstanding discussion is resolved, showing that both even and odd l spheroidal modes are active. The theoretically predicted scattering angle dependence of the BLS intensity is verified.

[1]Cheng et al., *J. Chem. Phys.* **123**, 121104, 2005.
[2]Still et al., *Nano Lett.* **8**, 3194, 2008; *J. Coll. Int. Sci.* **340**, 42, 2009; *Macromolecules* **43**, 3422, 2010.
[3]Still et al., *J. Phys. Chem. Lett.* **1**, 2440, 2010.

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