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Laser speckle visibility acoustic spectroscopy in soft turbid media FRÉDÉRIC WINTZENRIETH, Université Paris 6 (INSP), SYLVIE COHEN-ADDAD, Université Paris 6 (INSP), Université Paris-Est (LPMDI), MARIE LE MERRER[1], Université Paris 6 (INSP), REINHARD HÖHLER, Université Paris 6 (INSP), Université Paris-Est (LPMDI) — We image the evolution in space and time of an acoustic wave propagating along the surface of turbid soft matter by shining coherent light on the sample. The wave locally modulates the speckle interference pattern of the backscattered light and the speckle visibility[2] is recorded using a camera. We show both experimentally and theoretically how the temporal and spatial correlations in this pattern can be analyzed to obtain the acoustic wavelength and attenuation length. The technique is validated using shear waves propagating in aqueous foam.[3] It may be applied to other kinds of acoustic wave in different forms of turbid soft matter, such as biological tissues, pastes or concentrated emulsions.

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[2]P. K. Dixon et D. J. Durian, "Speckle Visibility Spectroscopy and Variable Granular Fluidization," Phys. Rev. Lett., vol. 90, no 18, p. 184302, 2003.
[3]F. Wintzenrieth, S. Cohen-Addad, M. Le Merrer, et R. Höhler, "Laser speckle visibility acoustic spectroscopy in soft turbid media," Phys. Rev. E, 2013. (Submitted)

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