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Elasticity of the eye's crystalline lens: A Brillouin light scattering study. S. BAILEY, Department of Physics, The Ohio State University, J. GUMP, Naval Surface Warfare Center, Indian Head, MD, R. SOORYAKUMAR, C. JAYAPRAKASH, Department of Physics, The Ohio State University, M.S. VENKITESHWAR, M. BULLIMORE, Department of Optometry, The Ohio State University, M. TWA, College of Optometry, University of Houston — Focusing the eye on a near object results in an increase in its optical power brought about by contraction of the ciliary muscles and an increase in the lens surface curvature. Distant vision occurs when the muscular force flattens the lens. Central to the ability of the lens to alter shape are its mechanical properties. Thus, given that hardening of the lens would impede deformation and reduce its ability to undergo the changes required for accommodation, a noninvasive approach to measure the elastic properties of the lens is valuable. We present results of Brillouin scattering from bovine and human lenses (from the organ donor program at The Ohio State University) that measure their high frequency acoustic response. These measurements are conducted with a few milli-watts of laser power and, in the case of bovine lenses, from entire intact eye globes, allow the stiffness of the lens to be mapped across its cross-section. The results will be compared to values of the shear- and bulk-moduli determined from other techniques and the implications of differences in these moduli discussed.

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