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Frequency dependent squeezed light at audio frequencies JOHN MILLER, Massachusetts Inst of Tech-MIT — Following successful implementation in the previous generation of instruments, squeezed states of light represent a proven technology for the reduction of quantum noise in ground-based interferometric gravitational-wave detectors. As a result of lower noise and increased circulating power, the current generation of detectors places one further demand on this technique – that the orientation of the squeezed ellipse be rotated as function of frequency. This extension allows previously negligible quantum radiation pressure noise to be mitigated in addition to quantum shot noise. I will present the results of an experiment which performs the appropriate rotation by reflecting the squeezed state from a detuned high-finesse optical cavity, demonstrating frequency dependent squeezing at audio frequencies for the first time and paving the way for broadband quantum noise reduction in Advanced LIGO. Further, I will indicate how a realistic implementation of this approach will impact Advanced LIGO both alone and in combination with other potential upgrades.

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