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Optomechanical Squeezing of Light THOMAS PURDY, PEN-LI YU, ROBERT PETERSON, NIR KAMPEL, CINDY REGAL, JILA and Department of Physics, University of Colorado — Cavity optomechanical systems in the radiation-pressure-shot-noise dominated regime display a variety of quantum effects including measurement backaction heating and quantum correlations between light and mechanical motion. One consequence of latter effect is the creation of squeezed light at the output of such a system. We have generated optomechanically squeezed light using a membrane mechanical resonator inside an optical cavity. The quantum noise of the output light is measured to be reduced by 1.7 dB compared to the shot noise level. Additionally, since the mechanical motion is correlated with quantum fluctuations of the light, readout of the motion provides a non-destructive measurement of the light. We use this type of measurement along with active feedback to produce optical squeezing under conditions where passive optomechanical squeezing is absent.

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