

Abstract Submitted
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Improvement of the GEO600 gravitational wave detector using squeezed states of light KATHERINE DOOLEY, Caltech, LIGO SCIENTIFIC COLLABORATION — During the last 3 years, the GEO600 laser interferometer gravitational wave (GW) observatory, located near Hannover, Germany, has conducted the first long-term study of the permanent integration of a squeezed light source to such a detector. Squeezed vacuum states, which are generated using quantum optics, are injected into the output port of the laser interferometer, where they join the GW signal and improve the shot-noise-limited signal-to-noise ratio. An improvement up to a factor 1.5 above 800 Hz has been achieved at GEO600, as well as a squeezing application duty cycle of about 90%. New control loops have also been developed to ensure long-term stability of the integration of the squeezed light source to the GW detector. I will describe the squeezing experiment at GEO600 and report on the lessons learned for integration of a squeezed light source to future GW detectors, such as Advanced LIGO.

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