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**A low loss Faraday isolator for squeezed vacuum injection in Advanced LIGO** RYAN GOETZ, DAVID TANNER, GUIDO MUELLER, University of Florida — Using conventional interferometry, the strain sensitivity of Advanced LIGO is limited by a quantum noise floor known as the standard quantum limit (SQL). Injecting squeezed vacuum states into the output port of the interferometer allows for detector sensitivities below the SQL at frequencies within a band of observational interest. The effectiveness of squeezing in reducing quantum noise is strongly dependent upon the optical loss in the squeezed path. Thus, to combine the squeezed vacuum state with the interferometer output we require a Faraday isolator with both high power-throughput efficiency and high isolation ratio. A prototype isolator is currently being developed, and we will discuss the design goals and current status.

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