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**Enhanced on-resonance squeezing from four wave mixing via additional optical beam**[1] CHRISTOPHER LEONARD, SAESUN KIM, ALBERTO MARINO, University of Oklahoma — Squeezed light is an essential resource in quantum-enhanced metrology, particularly in optical based devices that take advantage of its reduced noise properties. In order to take advantage of squeezed light in atomic systems, it is necessary to generate resonant squeezed light to enable an efficient light-atom interaction. While we have previously generated squeezed light resonant with the D1 line of $^{87}$Rb using four-wave mixing (FWM) in $^{85}$Rb, generating resonant squeezed light on the D2 line would be useful to trap or probe cold atoms in optical lattice experiments. However, it has been shown that the more complicated energy level structure of the D2 line makes it difficult to achieve squeezing on resonance with this transition. To enhance off-resonance FWM on the D2 line, previous experiments have dressed the atomic states with an additional co-propagating beam and demonstrated an improvement in their level of squeezing. We combine the use of a counter-propagating beam with our previous configuration for the FWM in $^{85}$Rb to generate squeezed light on resonance with the D2 line of $^{87}$Rb. The counter-propagating beam is resonant with the D1 line of $^{85}$Rb and leads to an increase in FWM gain as well as 1 dB of squeezing.

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