Abstract Submitted
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Generation of ^{87}Rb-resonant bright twin beams with four-wave mixing[1] SAESUN KIM, ALBERTO MARINO, Univ of Oklahoma — Squeezed states of light have found a number of useful applications in quantum-enhanced metrology due to their reduced noise properties. There is a particular interest in generating narrow-band squeezed light on atomic resonance in order to achieve an efficient interaction with atomic ensembles. We generate bright two-mode squeezed states of light, or twin beams, with a non-degenerate four-wave mixing (FWM) process in hot ^{85}Rb in a double-lambda configuration. Given the proximity of the energy levels in the D1 line of ^{85}Rb and ^{87}Rb, we are able to operate the FWM in ^{85}Rb in a regime that generates two-mode squeezed states in which one mode is on resonance with the D1 $F = 2$ to $F' = 2$ transition and the other mode is on resonance with the D1 $F = 1$ to $F' = 1$ transition of ^{87}Rb. For this configuration, we obtain an intensity difference squeezing level of 3.5 dB. Moreover, the intensity difference squeezing increases to 5.4 dB and 5.0 dB when only one of the modes of the squeezed state is resonant with the either the D1 $F = 2$ to $F' = 2$ or $F = 1$ to $F' = 1$ transition, respectively. These resonant quantum correlated twin beams can improve atomic interferometers and will make it possible to entangle two distant atomic ensembles in the continuous variable regime.

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