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Dispersive properties of the phase-sensitive amplifier based on four-wave mixing in hot ^{85}Rb vapor[1] TIAN LI, RYAN GLASSER, Joint Quantum Institute, National Institute of Standards and Technology and the University of Maryland, College Park, MD 20742, USA, PAUL LETT, Quantum Measurement Division, National Institute of Standards and Technology and Joint Quantum Institute, NIST and UMD, Gaithersburg, MD 20899, USA — We investigate the dispersive properties of the phase-sensitive amplifier based on four-wave mixing in hot ^{85}Rb vapor. We know from previous experiments [U. Vogl, *et al.*, New J. Phys. **16**, 013011 (2014).] that quantum correlations can be advanced by fast light propagation, and that the noise added by the phase-insensitive amplifier prevents an advancement of entanglement, bounding the leading edge of the quantum correlations. Slow light propagation, however, is capable of producing a time shift in both the leading edge and the maximum of the mutual information. In the case of a phase-sensitive amplifier it is well known that no extra noise will be added given the correct relative phases (e.g. at the maximal amplification and the maximal deamplification) among the inputs. We have observed that the group index has a dependence on the relative input phases, indicating that there exists no dispersion at the maximal amplification or the maximal deamplification, while at some phases in between these two extremes, the dispersion is non-zero. Further exploration of the dispersive properties, quantum noise correlations, and quantum mutual information propagation through a phase-sensitive amplifier will also be discussed.

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Tian Li
Joint Quantum Institute, National Institute of Standards and Technology
and the University of Maryland, College Park, MD 20742, USA

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