

Abstract Submitted
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Second quantization of propagation of light through Rb vapor ZHIHAO XIAO, ROBERT LANNING, Department of Physics Astronomy, Louisiana State University, MI ZHANG, IRINA NOVIKOVA, EUGENIY MIKHAILOV, Department of Physics, College of William Mary, JONATHAN DOWLING, Department of Physics Astronomy, Louisiana State University — We model the propagation of squeezed light, in Laguerre-Gaussian spatial modes, through a non-linear medium such as Rb vapor. We examine the changes in both quantum state and spatial modes. We simulate the injection into a Rb vapor cell a linearly polarized laser beam to create squeezed vacuum state of light linearly polarized in the perpendicular direction. We fully quantize the optical field's propagation which is originally based on semi-classical calculation. The Rb atomic structure is simplified to a three-level system. We reveal the mechanism that how squeezed state of light is generated in this process and compare the theory with our experiment. We further investigate the impact on squeezing due to the change of parameters and produce schemes which improve the squeezing in the desired spatial modes.

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