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Bose-Einstein condensates and their bright solitons in circular waveguides MARTIN D. KANDES, OSCAR O. SALAZAR, MICHAEL W.J. BROMLEY, Department of Physics, San Diego State University, RICARDO CARRETERO-GONZÁLEZ, Department of Mathematics and Statistics, San Diego State University, BRETT D. ESRY, Department of Physics, Kansas State University — Following the recent trapping and propagation of Bose-Einstein condensates around circular waveguides, we present theoretical results exploring some possible issues that may arise in future Sagnac interferometry experiments, particularly when perfect rings are tilted in gravity. We employ, firstly, a 1-D mean-field model to compare and contrast the interference observed when counterpropagating either BEC's, or continuously dispersion managed BEC's, or gap solitons. Secondly, we use 2-D simulations to determine the transverse excitations induced when splitting a curved wavepacket, either under instantaneous momentum transfer, or when the wavepacket is split using adiabatically raised potentials. We also present a simple classical model for the resultant amount of excitation which is valid for a range of experimentally accessible conditions.

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