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Fringe visibility and Which-Way information for Robust Entangled Fock states KEBEI JIANG, MOOCHAN KIM, CHASE BRIGNAC, HWANG LEE, JONATHAN DOWLING, Louisiana State University — It has been shown that mm states, a class of path-entangled Fock states which have non-zero photon numbers on both arms of a two-mode interferometer, are robust against photon loss to a certain degree. To explain the reason for such robustness we calculate which-way information, the visibility of interference fringe and the degree of entanglement for mm states in a two-mode interferometer. We go on to derive a complementarity relation between these quantities. We show that less which-way information is revealed by using mm states than NOON states. This is because of the decoyed photons which are present in both arms of the interferometer. Hence mm states provide better visibility.

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