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Instability and Vortices (Phase Singularities) in the Output of Class B Lasers

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Abstract

We have solved the generalized Maxwell-Bloch equations including transverse modes in a CO₂ laser as a candidate for class B lasers. Instabilities in the output of the laser intensity as well as the diminish of the electric field from certain positions (i.e. vortices) are observed to occur in the transverse distribution of a unidirectional ring cavity. TE Ms are taken into account by the addition of Gauss-Laguerre polynomials.