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Mode nonorthogonality in nonhermitian PT-symmetric optical resonators GWANGSU YOO, H.-S. SIM, Department of Physics, Korea Advanced Institute of Science and Technology, Daejeon 305-701, Korea, HENNING SCHOMERUS, Department of Physics, Lancaster University, Lancaster LA1 4YB, United Kingdom, QUANTUM ELECTRON TRANSPORT THEORY GROUP TEAM, CENTRE FOR NANOSCALE DYNAMICS AND MATHEMATICAL MODELLING COLLABORATION — PT -symmetric optical resonators combine absorbing regions with active, amplifying regions. The latter are the source of radiation generated via spontaneous and stimulated emission, which embodies quantum noise and can result in lasing. We calculate the frequency-resolved output radiation intensity of such systems and relate it to a suitable measure of excess noise and mode nonorthogonality. The lineshape differs depending on whether the emission lines are isolated (as for weakly amplifying, almost hermitian systems) or overlapping (as for the almost degenerate resonances in the vicinity of exceptional points associated to spontaneous PT -symmetry breaking). The calculations are carried out in the scattering input-output formalism, and are illustrated for a quasi one-dimensional resonator set-up.

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