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Coupled ℓ-wave confinement-induced resonances in cylindrically symmetric waveguides PANAGIOTIS GIANNAKEAS, Zentrum fuer Optische Quantentechnologien, Universitaet Hamburg, Luruper Chaussee 149, 22761 Hamburg, Germany, FOTIOS DIAKONOS, Department of Physics, University of Athens, GR-15771 Athens, Greece, PETER SCHMELCHER[1], Zentrum fuer Optische Quantentechnologien, Universitaet Hamburg, Luruper Chaussee 149, 22761 Hamburg, Germany — A semi-analytical approach to atomic waveguide scattering for harmonic confinement is developed taking into account all partial waves. As a consequence ℓ-wave confinement-induced resonances are formed being coupled to each other due to the confinement. The corresponding resonance condition is obtained analytically using the K-matrix formalism. Atomic scattering is described by transition diagrams which depict all relevant processes the atoms undergo during the collision. Our analytical results are compared to corresponding numerical data and show very good agreement.

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