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Stationary light and Klein tunneling JOHANNES OTTERBACH, RAZMIK UNANYAN, MICHAEL FLEISCHHAUER, Fachbereich Physik, Technische Universitaet Kaiserslautern — We discuss the generation and coherent manipulation of stationary pulses of light in atomic ensembles with electromagnetically induced transparency. In particular we discuss the limits on the spatial confinement of these pulses when the latter becomes comparable to the absorption length of the medium. In this case the stationary light field in the dilute gas can be described by a two-component spinor which obeys the two-dimensional Dirac-Weyl equation in an external potential generated by a spatially varying index of refraction. Using analytical and numerical methods, we show that a fundamental lower limit to the spatial confinement arises from Klein tunneling. We determine the linewidth of the resonances in the effective potential and discuss conditions for optimizing spatial confinement and tunneling losses.

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