

Abstract Submitted
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Reshaping quantum wave packets through time-dependent absorption ARSENI GOUSSEV, Northumbria University — The problem of control and reliable manipulation of quantum states finds importance in many areas of physics including quantum metrology and matter-wave interferometry. Here we propose a new approach to reshaping the spatial wave function of a quantum particle, e.g., an atom, by passing the latter through a time-dependent absorbing barrier. Experimentally, such a barrier can be realized by means of a sharply focused laser beam or a light sheet, with the radiation frequency chosen to make the passing atom undetectable, for instance, by ionizing the atom or changing its internal state. In particular, we show how the proposed method can be used to shift, squeeze, or split spatially-localized quantum wave packets.

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