

Abstract Submitted
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Nonlinear Scattering of Bose-Einstein Condensates on a Finite Barrier¹ RACHEL MILLER, MATTHEW HELLER, Physics Department, Colorado School of Mines, Golden, CO 80401, DANIEL BOLTON, University of Washington, LINCOLN CARR, Physics Department, Colorado School of Mines, Golden, CO 80401 — We consider the scattering of a Bose-Einstein condensate (BEC), or atom laser, on a finite barrier. The nonlinear Schrodinger equation is used to model the mean field of the BEC. Although we cannot treat incident plus reflected waves, since the governing equation is nonlinear, nevertheless we can obtain steady state behavior of a BEC in this physical situation. We find the full solution to this problem in closed analytic form, including classes of solutions which have no analog in the standard problem from linear quantum mechanics of the finite square well, and describe the transmission resonances. Our study is useful in the construction of atom laser devices.

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