

Abstract Submitted
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Separation induced resonances in quasi-one-dimensional ultracold atomic gases WENBO FU, Institute for Advanced Study, Tsinghua University, Beijing, 100084, ZHENHUA YU, Department of Physics, Ohio State University, Columbus, OH 43210, XIAOLING CUI, Institute for Advanced Study, Tsinghua University, Beijing, 100084 — We study the effective one-dimensional (1D) scattering of two distinguishable atoms confined individually by *separated* transverse harmonic traps. With equal trapping frequency for two s-wave interacting atoms, we find that by tuning the trap separations, the system can undergo *double* 1D scattering resonance, named as the separation induced resonance(SIR), when the ratio between the confinement length and s-wave scattering length is within $(0.791, 1.46]$. Near SIR, the scattering property shows unique dependence on the resonance position. Right at SIR, the universal property of a many-body system is manifested by studying the interaction effect of a localized impurity immersed in a Fermi sea of light atoms. The proposed SIR can be realized in cold atom experiment.

Wenbo Fu
Institute for Advanced Study, Tsinghua University, Beijing, 100084

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