Generalized confinement-induced resonances(CIR) in quasi-1D system[1] CHEN ZHANG, CHRIS GREENE, JILA, physics department of University of Colorado at Boulder, physics department of Purdue University — Reduced dimension systems have been realized in ultracold atomic gases to explore new physics, and the scattering properties of atoms in these systems are particularly interesting. Confinement-induced resonances occur in quasi-1D systems when the quasi-1D scattering phase shift of a particle scattered by a infinitely massive particle in the center of a quasi-1D tube jumps by Pi. In this project, we analytically derive the position of this quasi-1D CIR for different transverse trapping potentials at low energy under the frame transformation approximation [2], which generalizes the well-known results for an isotropic harmonic oscillator trap in the transverse plane [1,2]. We isolate the contribution from all the closed channels by regularizing a divergent summation of all closed channel components. We have verified our analytical results for a square-hard-wall transverse trap system numerically using short range model potentials, and shows finite range corrections of the zero-range model. [1] M. Olshanii, Phys. Rev. Lett. 81 938 (1998) [2] B. Granger and D. Blume, Phys. Rev. Lett. 92 13(2004)

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