

Abstract Submitted
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Analytical bound-state solutions for a confining potential with an asymptotically free region JEREMY KAMIN, ATHANASIOS PETRIDIS, Drake University — The time-independent Schrödinger equation is solved analytically to obtain the ground-state energy and eigenfunction for a confining potential that includes a linear and a short-range asymptotically free part. The solution that involves Airy functions of the first and second kind is obtained in closed form in the limit of low binding energies. Such solutions apply to the case of charmonium or bottomonium states in which the constituent quarks are massive enough to justify a non-relativistic treatment. The results are in agreement with numerical calculations that solve the Schrödinger equation with the same confining potential by means of imaginary-time propagation.

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