



Universidad de Valladolid



On the Hamiltonian describing two attractive nonlocal δ' -interactions with equal strength

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Abstract: By means of the procedure known as renormalisation of the coupling constant, we achieve in a rigorous way the definition of the self-adjoint Hamiltonian making sense of the merely heuristic expression involving two attractive nonlocal δ' -interactions with equal strength symmetrically situated about the origin at a distance $x_0 > 0$. We study in detail the discrete spectrum of such a self-adjoint Hamiltonian, $H_{sa}(\beta, x_0)$, showing that it consists of two negative eigenvalues (energy levels), and analyse their dependence on the two relevant parameters of the model. Finally, we analyse the behaviour of this Hamiltonian as $2x_0$, the distance between the two centres, shrinks to zero.



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