

**Relativistic and nonrelativistic solutions of the generalized Poschl–Teller and hyperbolical potentials with some thermodynamic properties**

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**Abstract**

By using the new approximation type, the Dirac equation is solved with the combination of Generalized Pöschl–Teller and Hyperbolical potentials within the framework of supersymmetric approach. The energy levels are obtained for both pseudospin and spin symmetries and the nonrelativistic limit is obtained with the corresponding wave functions in terms of hypergeometric functions. Some thermodynamic properties are equally obtained with the energy equation of the nonrelativistic limit.

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