

**Approximate bound-states solution of the Dirac equation with  
some thermodynamic properties for the deformed Hylleraas  
plus deformed Woods-Saxon potential**

M.C. Onyeaju<sup>1,a</sup>, A.N. Ikot<sup>1</sup>, C.A. Onate<sup>2,3</sup>, O. Ebomwonyi<sup>3</sup>, M.E. Udoh<sup>1</sup>, and J.O.A. Idiodi<sup>3</sup>

<sup>1</sup>Theoretical Physics Group, Department of Physics, University of Port Harcourt, P.M.B. 5323 Choba,  
Port Harcourt, Nigeria

<sup>2</sup>Department of Physical Sciences, Landmark University, Omu-Aran, Nigeria

<sup>3</sup>Physics Department, University of Benin, Benin, Nigeria

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**Abstract.**

The Pekeris approximate scheme is introduced to deal with the centrifugal term in a Dirac equation with the deformed Hylleraas plus Woods-Saxon (DHWS) potential model. The relativistic energy solutions for the spin and pseudospin symmetries are obtained via the Nikiforov-Uvarov (NU) method. In the non-relativistic limits we calculated the thermodynamics properties for some selected diatomic molecules.

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