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Thermal Properties of Duffin Kemmer Petiau Oscillator under the Influence of an External Magnetic field in Non-Commutative Space

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Abstract: In this work, we present the study of thermal properties of a relativistic quantum system describing the oscillatory motion of DKP particle (spins 0 and 1) under the effect of an external magnetic field in non-commutative space.In the first step, which is in the case of spin 0, the motion equation is reduced to the Klein-Gordon problem with the same interaction, where the spectrum energy and wave functions are then deduced using the confluent hypergeometric method. In the second step, which dealing with the case of spin 1, we have subtracted that the problem is analogous to the behavior of the DKP equation of spin 1 describing the motion of a vector boson subjected to the action of a constant magnetic field in a commutative space, with additional correction depending on the parameter of non-commutatively,so that the problem refer to the non relativistic limit in order to obtain the spectrum. In the end, we analyze the system's thermodynamic properties.

Keywords: DKP Oscillator; Non-Commutative space; Thermodynamic Properties.

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