



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

Lakhdar Sek<sup>1</sup>, Mokhtar Falek<sup>1</sup>, Mustafa Mourni<sup>1</sup>.

<sup>1</sup> Laboratory of Photonic Physics and Nano-Materials (LPPNNM), Department of Matter Sciences, University of Biskra, 07000 Biskra, Algeria.

lakhdar.sek@univ-biskra.dz

**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 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. For 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-commutativity. In the end, we analyze the system's thermodynamic properties.

**Keywords:** DKP Oscillator, Non-Commutative space, Thermodynamic Properties.

### References

1. Y. Nedjadi and R. C. Barrett, The Duffin Kemmer Petiau Oscillator. *J.Phys.A:Math.Gen.*27, 4301 (1994)
2. M. Falek and M. Merad, DKP Oscillator in a Non-commutative Space. *Commun. Theor. Phys.* 50 587 (2008).
3. Mirza, B., Narimani, R., & Zare, S. Relativistic Oscillators in a Non-commutative Space and in a Magnetic Field. *Communications in Theoretical Physics*, 55(3), 405–409. (2011)