Dear Editor

It is a pleasure to submit our manuscript "Statistical properties in linear Majorana fermions" to International Journal of Quantum Chemistry. The outstanding editorial board and the scope of our work on relativistic quantum mechanics made us choose IJQC as a suitable and most recommended journal to the present work.

As a matter of fact, several papers about application of the Shannon entropy or even Fisher information theory to quantum mechanical systems has been published in IJQC in the last years. We can cite some articles quite recently published by this journal, namely,

Theoretic quantum information entropies for the generalized hyperbolic potential (2020; e26410);
Shannon entropy and Fisher information for screened Kratzer potential (2020;e26246);
Fisher information of a vector potential for time-dependent Feinberg-Horodecki equation (2020;e26543);
Information and thermodynamic properties of a non-Hermitian particle ensemble (2020; e26645).

In the last two decades, there has been a significant increase in the interest of many researchers [1,2,3] and supporters of the study of the Majorana fermions. Indeed, a new branch has emerged for studies involving these particles [4], for example, the study of Majorana fermions in physics of condensed matter, e. g., in studies of topological superconductors [5,6]. The study of Majorana fermions are also been used to describe theories applied to quantum computing as presented in refs. [7,8]. Indeed, among the Majorana fermions applications in the quantum computing scenario, systems of pair of Majorana fermions can be used as decoherence-free quantum memory [9]. It is a fact that a single Majorana fermion cannot interact with the environment on its own, since these particles are described by a non-physical operator. In this way, decoherence can only arise from an interaction mediated by the environment of two fermions of Majorana [10].

In our paper, we investigated Shannon's entropy of a linear Majorana fermions to understand how this quantity is modified due to external potential field of the linear type. Subsequently, we turn our attention to the construction of an ensemble of these Majorana particles to study the thermodynamic properties of the model. Finally, we show how Shannon's entropy and thermodynamic properties are modified with the action of the linear potential field.

We include three suggestion of referees:

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Best regards,
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AUTHOR CONTRIBUTIONS
F. C. E. Lima: Conceptualization; investigation; writing-original draft. **A. R. P. Moreira**: Conceptualization; investigation. **L. E. S. Machado**: Investigation. **C. A. S. Almeida**: Formal analysis; investigation; writing-review and editing.

Highlights:
In a context of relativistic quantum mechanics, we use information theory to study Shannon's entropy of linear Majorana fermions.

An ensemble of Majorana fermions subject to linear scalar potential is constructed and we study the thermodynamic properties of the system.

We show how information and thermodynamic properties are modified with the variation of a parameter that controls the potential.

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