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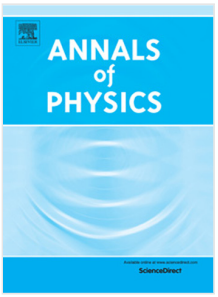

Quantum mechanics of a constrained particle on an ellipsoid: Bein formalism and Geometric momentum

H. Panahi, L. Jahangiri

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Quantum mechanics of a constrained particle on an ellipsoid: Bein formalism and Geometric momentum

H. Panahi *, L. Jahangiri †

Department of Physics , University of Guilan, Rasht 41635-1914, Iran.

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Abstract

In this work we apply the Dirac method in order to obtain the classical relations for a particle on an ellipsoid. We also determine the quantum mechanical form of these relations by using of Dirac quantization. Then by considering the canonical commutation relations between the position and momentum operators in terms of curved coordinates, we try to propose the suitable representations for momentum operator that satisfy the obtained commutators between position and momentum in Euclidean space. We see that our representations for momentum operators are the same as geometric one.

Keywords: Quantum mechanics, Ellipsoid, Dirac method, Bein formalism, Geometric momentum.

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*Corresponding author (E-mail: t-panahi@guilan.ac.ir)

†(E-mail: laleh.jahangiry@yahoo.com)

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