Turkish Journal of Physics

🔍 Keywords
🔍 Authors

@

Scientific Journals Home Page

The Wigner problem in electrodynamics

Andrzej HORZELA
H. Niewodnicza'nski Institute of Nuclear Physics
ul. Radzikowskiego 152, 31 342 Kraków-POLAND
e-mail: andrzej.horzela@ifj.edu.pl

Abstract: The relation between canonical commutation rules and a shape of acting force is analysed. It is shown that canonical commutation relations and Newtonian equations of motion for a single particle dynamics do imply the force to be of the Lorentz type but the inverse is not true. The example of a single particle motion in a constant magnetic field shows that equations of motion allow an alternative to canonical commutation relations to exist and it is a Lie algebra. The algebra found is of the type of algebras found in studies leading towards noncommutative geometry approaches to physical problems.