Abstract Submitted
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On the correspondence between classical geometric phase of gyro-motion and quantum Berry phase[1] HONGXUAN ZHU, Princeton University, HONG QIN, PPPL/USTC — We show that the geometric phase of the gyro-motion of a classical charged particle in a uniform time-dependent magnetic field described by Newton's equation can be derived from a coherent Berry phase for the coherent states of the Schrdinger equation. This correspondence is established by constructing coherent states for a particle using the energy eigenstates on the Landau levels and proving that the coherent states can maintain their status of coherent states during the slow varying of the magnetic field. It is discovered that the orbital Berry phases of the eigenstates interfere coherently to produce an observable effect, which is exactly the geometric phase of the classical gyro-motion. The use of the adiabatic theorem is justified. The conclusion also applies to electrons described by the Dirac equation. [1]

[1] Hongxuan Zhu and Hong Qin *On the correspondence between classical geometric phase of gyro-motion and quantum Berry phase*, Phys. Plasmas **24**, 022121 (2017).

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