Abstract Submitted
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**Monodromy matrix theory of Trojan wave packets on elliptical orbits** MATT KALINSKI, Utah State University — The possibility of existence of so called Trojan wavepackets on elliptical orbits, nondispersing wave packets once predicted on cirular orbits while the Hydrogen atom is placed in the CP field has been predicted both theoretically [1] and after many years finally confirmed experimentally in recent microwave experiments. They are caused by so called population lock on the resonance with the infinite semi-harmonic but nonlinear spectrum. However no extension of harmonic theory has been given which simply explains the phenomenon as generalized concept of the Paul trap in the atom but for the single electron. Hereby we apply the monodromy matrix theory originally developed by Heller [2] to study such phenomenon. We define the instantaneous Hamiltonian for the electron an the elliptical orbit and surprisingly find out that it needs not to have real eigenvalues for all times of the circular motion while the packed motion is still nondispersing. Numerical simulations using split-operator method are also presented. [1] E. A. Shapiro, M. Kalinski, and J. H. Eberly, "Non-circular Trojan-like wavepackets: quantum theory and application to quantum control," J. Phys. B **33**, 3079, (2000); [2] E. J. Heller, "Bound-State Eigenfunctions of Classically Chaotic Hamiltonian Systems: Scars of Periodic Orbits," Phys. Rev. Lett. **53**, 1515 (1984).

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