

Abstract Submitted
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Guiding center revisited and orbital spectral analysis for non-axisymmetric perturbations K. HIZANIDIS, P.A. ZESTANAKIS, Y. KOMINIS, G. ANASTASIOU, NTUA, Greece — A systematic transformation algorithm from guiding center (GC) coordinates to action-angle variables for any type of magnetic equilibrium is presented. It exploits Hamiltonian methods for describing single and collective particle dynamics for various types of interactions. It accounts for finite orbit width effects and performs orbit averaging calculations for particles at any energy, pitch angle and radial position for any type of non-axisymmetric perturbations. Furthermore, the GC picture is revisited on the basis of the differential geometry features of the particle orbit and its transverse to the local magnetic field evolve. The latter yields the exact fully relativistic vectorial gyration radii which can be approximated by the respective Larmor ones under certain conditions. The approach incorporates inhomogeneous magnetic and electric fields as well as magnetic field perturbations. *This project is partially funded by EU Horizon 2020 Research and Innovation Programme under GA No. 633053 (the views and opinions expressed herein do not necessarily reflect those of the European Commission and the Hellenic NPTFR).*

Abhay Ram
PSFC-MIT

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