Abstract Submitted for the DPP05 Meeting of The American Physical Society

A quasi-optical ray tracing code for EC absorption and current drive DANIELA FARINA, Istituto di Fisica del Plasma, CNR, EURATOM-ENEA-CNR Assoc., Milano, Italy — A new code GRAY has been developed for the quasioptical (QO) propagation of a Gaussian beam of EC waves and the relevant absorbed power and driven current in a generic tokamak equilibrium [D. Farina, IFP-CNR Int. Rep. 2005, FP 05/1]. In the framework of the complex eikonal approach [E. Mazzucato, Phys. Fluids, 1, 1855 (1989)], the beam propagation is described by a set of mutually interacting rays. Several theoretical and numerical issues have been addressed and solved, mainly concerning the accurate solution of the complex dispersion relation. A fast numerical algorithm for the solution of the imaginary part of the QO dispersion relation has been implemented. Along each ray, EC wave absorption is computed solving either the weakly or the fully relativistic dispersion relation for EC waves (up to any order in Larmor radius expansion), and EC current drive by means of a neoclassical response function for the current [D. Farina, IFP-CNR Int. Rep. 2003, FP 03/5]. The code has been benchmarked against other existing codes, and used for calculations of EC driven current in ITER plasma.

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Date submitted: 15 Jul 2005

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