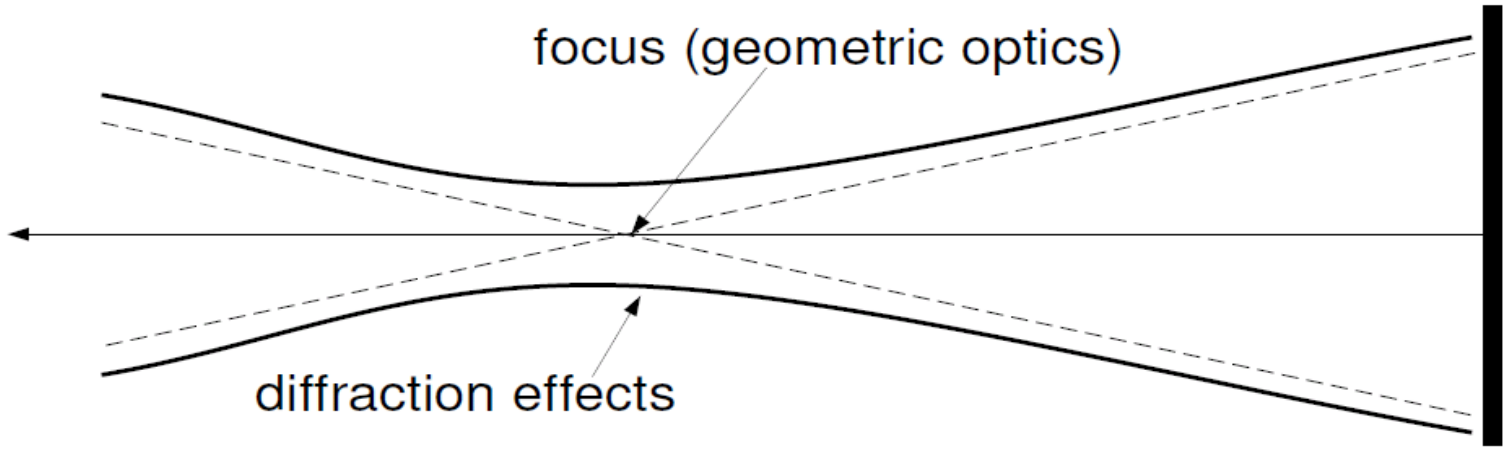
TORBEAM: Physical Model

Beam Tracing technique to retain diffraction (standard Hamiltonian equations for central ray, paraxial expansion around the central ray for beam width and phase-fron



Propagation: cold plasma; **relativistic corrections** through mass renormalization for propagation near cutoff (e.g. reflectometry applications)

Absorption: linear model, routine DAMPBQ by E. Westerhof (TORAY)

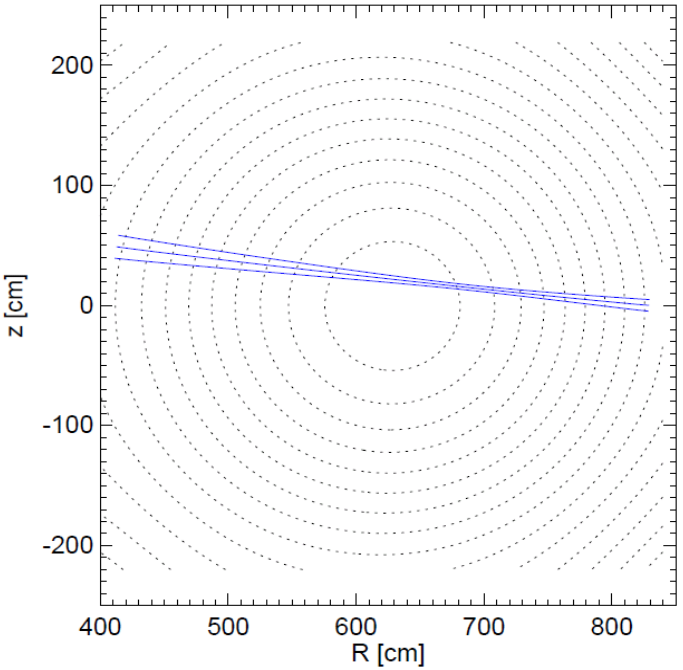
Current drive: adjoint approach for current drive, routine CURBA by R. Cohen, CURGAP by Lin-Liu, momentum conservation (Marushchenko) implemented and under test

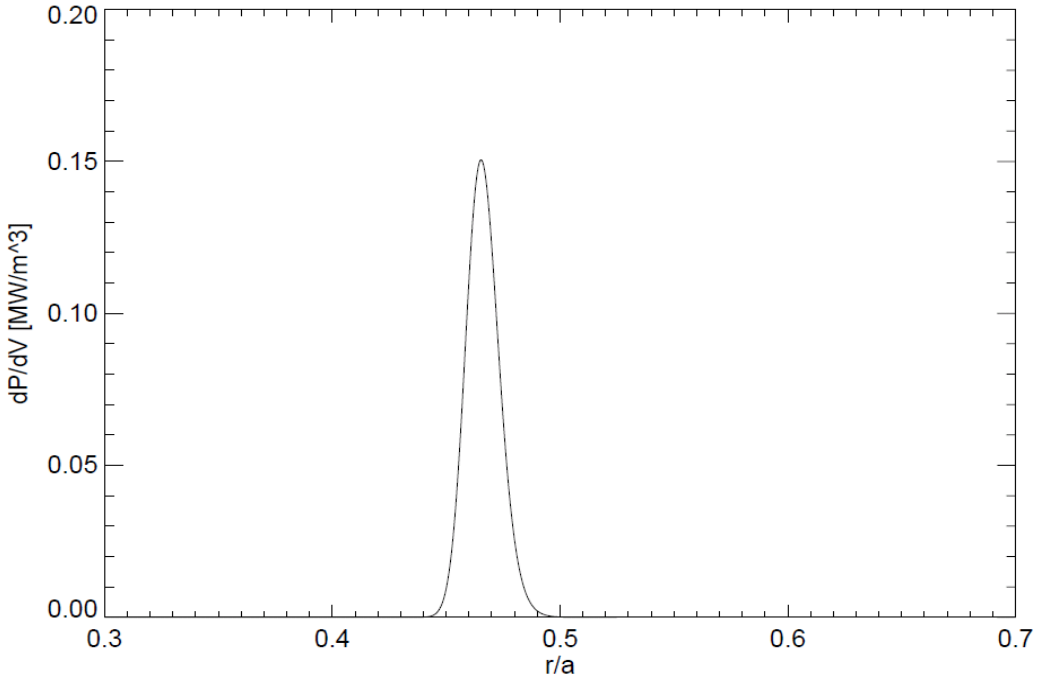
TORBEAM: ITM Status

TORBEAM **compiles and runs on gateway** (NAG free version: weakly relativistic absorption working, fully relativistic close to completion)

Magnetic equilibrium (B_R, B_ϕ, B_Z, ψ) and profiles (n_e, T_e vs. ψ) **from cpo's**

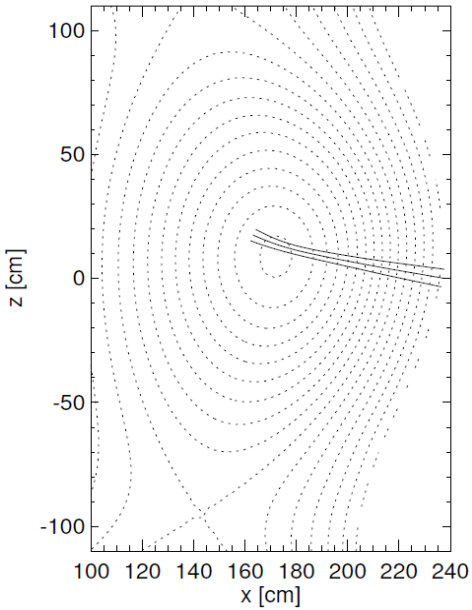
Test run for shot 5-67 (4.08a), first time slice, shown below; benchmark with GRAY under way

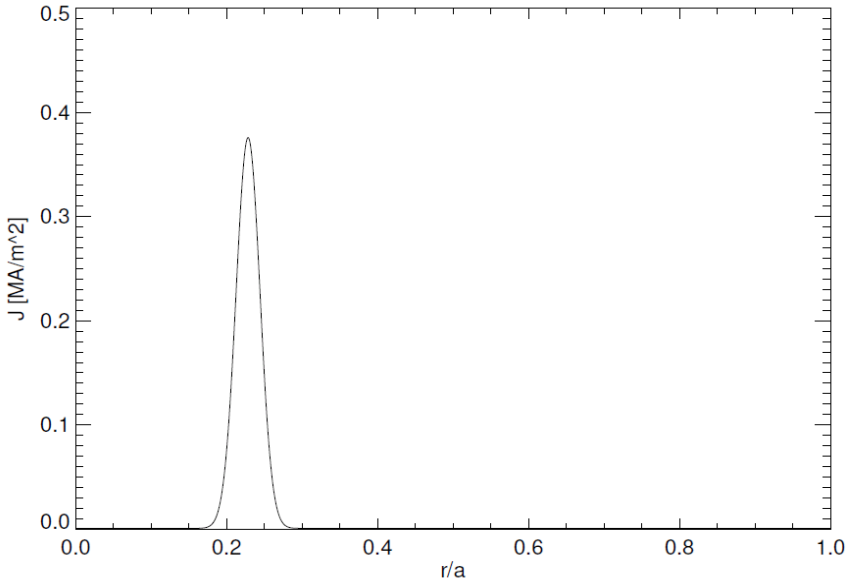




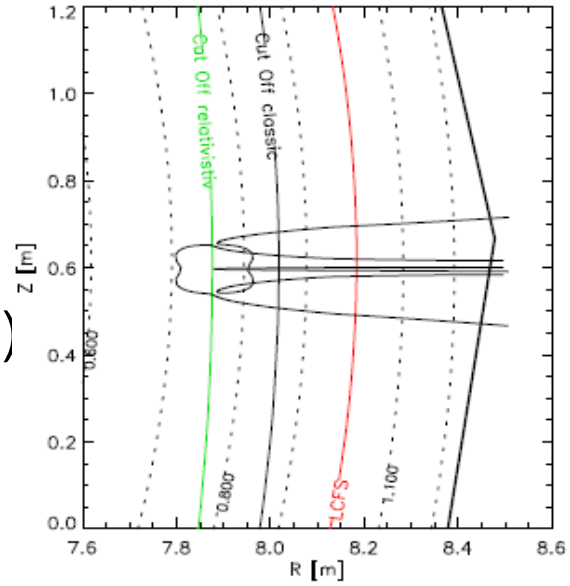
TORBEAM: Applications

ASDEX Upgrade
(Standard shot analysis, real-time applications)





ITER
(Reflectometry)



ITM
(Equilibrium 5-67, 4.08a)