Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Numerical study of alpha particle confinement in CFETR plasmas[1] FENG WANG, HAOJIE MA, RUI ZHAO, JINYUAN LIU, ZHENGXIONG WANG, Key Laboratory of Materials Modification by Laser, Ion and Electron Beams (Ministry of Education), School of Physics, Dalian University of Technology — Fusion born alpha particle confinement is a key issue in burning plasmas such as CFETR. A numerical code using particle orbit tracing method (PTC) has been developed to study energetic particle confinement in tokamak plasmas. Both full orbit and drift orbit solvers are implemented to analyze the Larmor radius effects of alpha confinement. The elastic collisions between alpha particles and thermal plasma are calculated by a Monte Carlo method. A triangle mesh in poloidal section is generated for electromagnetic fields expressing. Benchmark between PTC and orbit is accomplished for verification. For CFETR burning plasmas, PTC code is used for alpha particles slowing down process calculation in 2D equilibrium, and 3D TF ripples inducing alpha particle transport. In further, numerical results show that coupling between magnetic field islands and TF ripples has significant effects for alpha particle confinement.

[1]This work is supported by the National Key Research and Development Program of China No. 2017YFE0300500, 2017YFE0300501.

Feng Wang
Dalian University of Technology

Date submitted: 03 Jul 2019 Electronic form version 1.4