

Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

Density dependence of the alpha particle confinement in the LHD type helical reactor YOSHITADA MASAOKA, Kyoto University, SADAYOSHI MURAKAMI — In helical systems, high-energy particle trajectory is complicated in a three dimensional magnetic configuration and, thus the confinement of alpha particles is one of the critical issues in designing helical reactor. Based on the recent experimental results of LHD, the high-density plasma scenarios of the LHD type helical reactor are suggested. In this paper, we study the confinement of alpha particles in a heliotron reactor based on the three typical LHD configurations. The GNET code is applied to study the alpha-particle confinement with the energy and pitch angle scattering during the energy slow down. We study the real and velocity space distributions, and the energy and particle loss rates changing the plasma density keeping the total fusion power. It is found that the energy loss rate is strongly reduced, $E_{loss} \sim n^{-2.9}$, in the optimized configuration, base on the $R_{ax}=3.53\text{m}$, as the plasma density increases. While the reduction is rather small in the non-optimized configuration, based on the $R_{ax}=3.75\text{m}$.

Yoshitada Masaoka
Kyoto University

Date submitted: 16 Jul 2010

Electronic form version 1.4