

Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Effect of neoclassical poloidal viscosity and resonant magnetic perturbation on the response of the $m/n=1/1$ magnetic island in LHD
HUANG BOTSZ, The Graduate University for Advanced Studies (Sokendai),
SHINSUKE SATAKE, RYUTARO KANNO, YOSHIRO NARUSHIMA, SATORU
SAKAKIBARA, SATOSHI OHDACHI, National Institute for Fusion Science — In
the LHD experiments in which $m/n=1/1$ resonant magnetic perturbation (RMP)
amplitude is ramped up, it is observed that the perturbed field is initially shielded,
and when the amplitude exceeds a threshold value, the field penetrates into the
plasma and $m/n=1/1$ magnetic island appears. It is also found that the threshold
amplitude depends on the magnetic field configuration of LHD, that is, on the mag-
netic axis position. It is expected that the poloidal force balance between the elec-
tromagnetic force and the drag force from poloidal rotation determines the threshold
of island formation. Since neoclassical poloidal viscosity (NPV) in LHD strongly de-
pends on the magnetic axis position, we investigate the relationship between NPV
and the threshold amplitude of $m/n=1/1$ RMP to penetrate by using drift-kinetic
simulation code FORTEC-3D. ExB poloidal rotation determined from the ambipo-
lar radial flux condition is taken into account in the evaluation of NPV. We mainly
focus on the situation that the external magnetic perturbation is compensated by
the plasma response and therefore the effect of RMP on the total NPV is shielded.
However, by using a simple model to express the penetrated magnetic perturbation,
we will also study the dependence of NPV on the RMP amplitude.

Huang Botsz
The Graduate University for Advanced Studies (Sokendai)

Date submitted: 10 Jul 2014

Electronic form version 1.4