(SG2, TC) Session Report

May 01, 2024 (H. Nakano)

Date: May 01, 2024
Time: 10:30 – 16:45
Shot#: 190478 – 190571(shots)
Prior wall conditioning: H_2
Divertor pump: On
Gas puff: H_2
Pellet: (No)

NBI#(1, 2, 3, 4, 5) = gas(H, H, H, H, H)=P(4.6, 3.8, 3.9, 4.2, 5.6) MW
ECH(77GHz) = ant(1.5-Uo, 5.5-U, 2-OUR)=P(-, 0.70, 0.38) MW
ECH(154GHz) = ant(2-OLL, 2-OUL, 2-OLR)=P(0.71, 0.68, 0.72) MW
ICH(3.5U, 3.5L, 4.5U, 4.5L) = P(-, -, -, -) MW

Topics

1. Validation of neutral beam current drive in LHD for numerical estimation (Hideo Nuga)
2. Assessment of geometrical effect on transport through quadrupole field scan (Hiroshi Yamada)

Validation of NBCD simulation in LHD (H.Nuga)

Shot #:190478-190512 (incl. NBI calib. 3shots)

Experimental conditions:

(R_{ax}, Polarity, B_t, γ, B_q) = (3.6, CCW, 2.75, 1.2538, 100)

Background and motivation:

- Because stellarator-type devices do not require the plasma current, the estimation system of the current density profile remains poor.
- To develop NBCD simulation tools, the reference data for NBCD simulation are necessary.

Summary:

- NBCD experiments with MSE measurement were performed.
- Effect of ECH to the plasma current was also investigated.
- Plasma with ECH has a lesser beam-driven current despite the longer slowing-down time. (Fig.1)

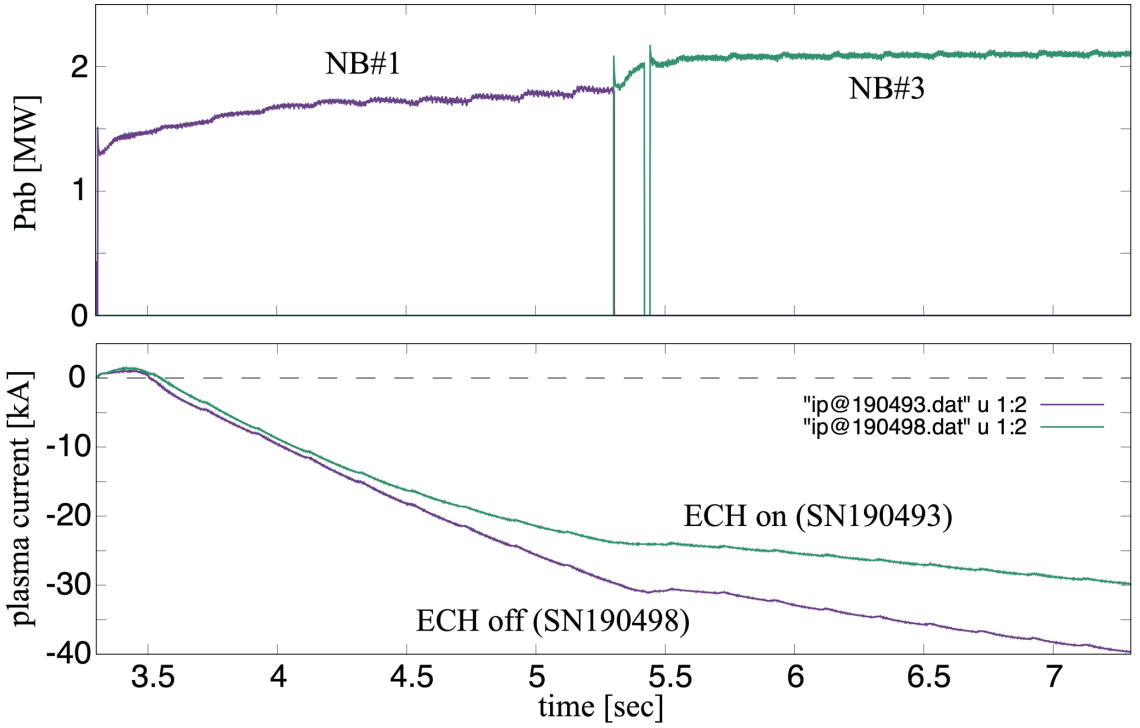


Fig.1: Time evolution of Ip

Assessment of geometrical effect on transport through quadrupole field scan

H.Yamada[1], R.Tani[1], N. Tamura[1,2], K.Tanaka[1], T.Tokuzawa[1], M.Yoshinuma1, K.ida1 et al.
[1]Utokyo, [2]NIFS

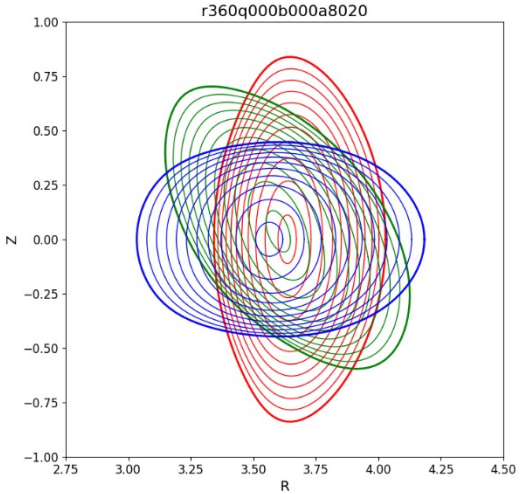
Experimental conditions:

(R_{ax}, Polarity, B, γ, B_q) = (3.6 m, CCW, 1.375 T, 1.1739, **100%**) 190512-190541
(3.6 m, CCW, 1.375 T, 1.2538, **0%**) 190542-190570

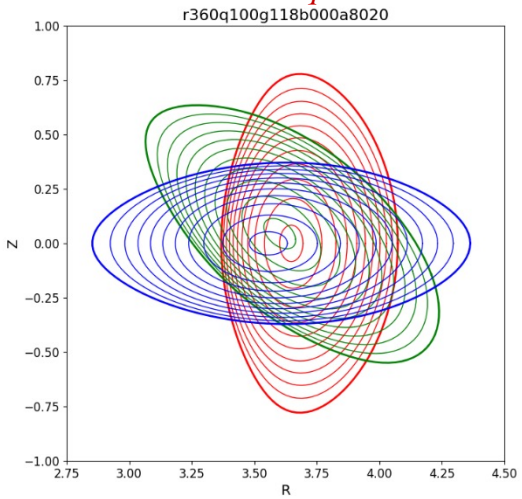
Background and motivation:

- This study revisits the assessment of geometrical effect due to elongation on transport with much more enriched/matured diagnostics and tools than the previous study in 2003-2004.
- **Elongation k** can be controlled from 0.8 to 1.4 by changing B_q=200%-0%

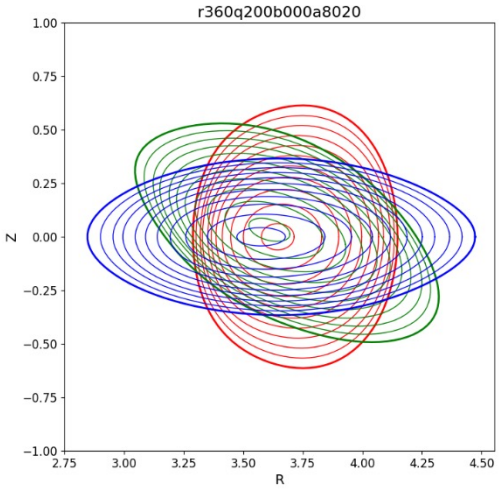
B_q=0%
κ = 1.4
γ = 1.25



B_q=100%
κ = 1.4
γ = 1.17



B_q=200%
κ = 0.8
γ = 1.25
done
on Apr.4

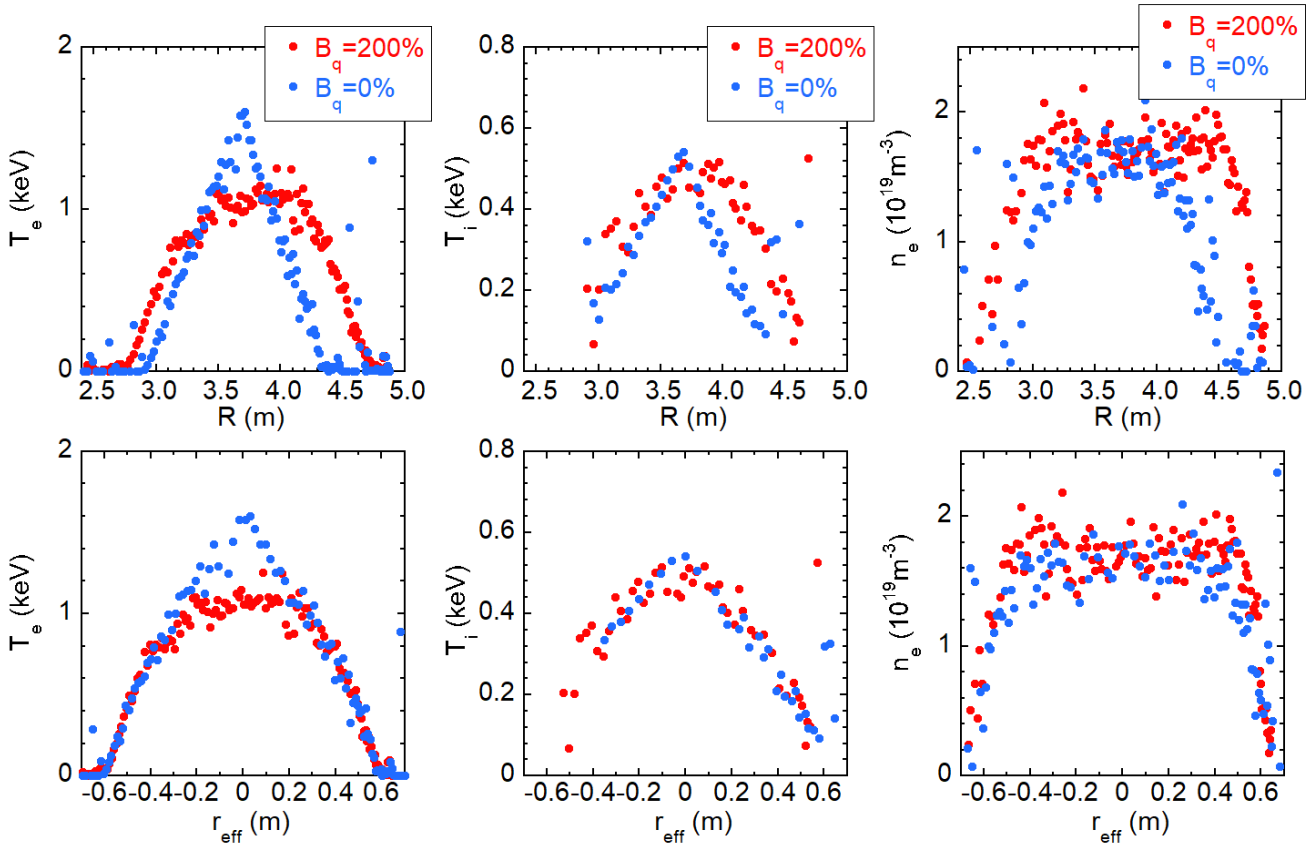


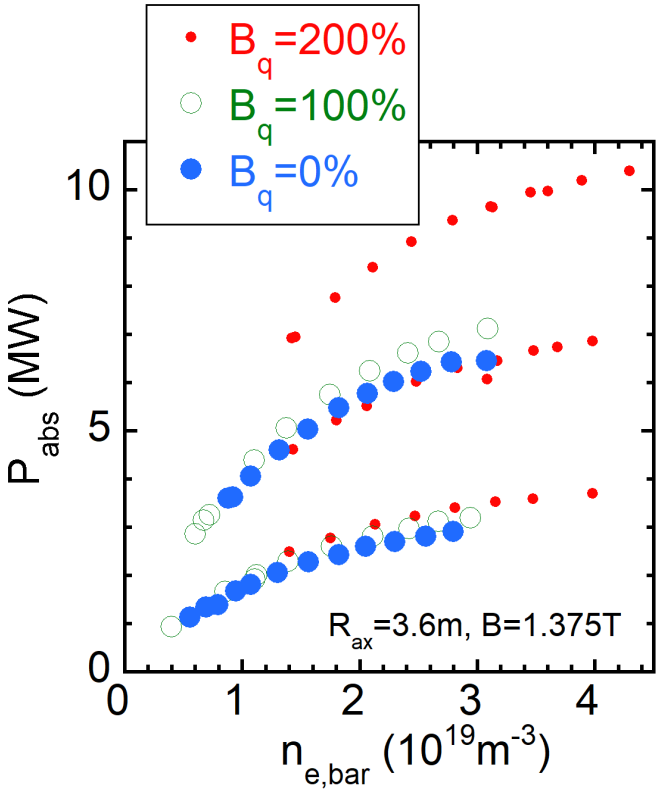
Subject on this day (May 1, 2024):

- Compilation of data in the case of B_q=100% (standard, but low γ) and 0% (prolate).

Assessment of geometrical effect on transport through quadrupole field scan

- Dataset to cover the ranges of density and heating power;
  0.4-3.1×10^{19}m^{-3} and 0.9 – 7.1 MW for B_q=100% and 0.6-3.1×10^{19}m^{-3} and 1.1 – 6.5 MW for B_q=0%





Scanned regime in density and absorbed heating power of NBI

- Integrated dataset will be subject to analysis of confinement/transport characteristics together with discussion of characteristics of density fluctuation (PCI, μ-wave scattering, reflectometer).