Overview of Operation and Experiments in the ADITYA-U tokamak

OV/5-3

- ✓ The first Indian tokamak ADITYA tokamak (a=25 cm, R=75cm) with limiter configuration, has recently been upgraded to ADITYA-U with diverter configuration and an additional graphite toroidal belt limiter.
- ✓ After successful commissioned of ADITYA-U, hydrogen gas breakdown has been achieved in more than 2000 discharges including Phase-I and Phase-II operation without a single failure.
- ✓ Improved discharges are attempted over a wider parameters range suitable for different experiments have been carried out in the ADITYA-U Phase-I and Phase-II operations. In this paper we provide operational aspects and overview of some experiments performed on ADITYA-U.
- ✓ Successful development and implementation of real time position control in Phase-II operation.
- ✓ Achieved wider pressure window and significant reduction in runaway electrons (REs) in ADITYA-U tokamak as compared to ADITYA tokamak.
- ✓ The chord average electron density boost up ~ 4 x 10^19 m^-3 corresponding to central peak density of ~ 6.7 x 10^19 m-3 has been achieved for the first time in ADITYA-U by sonic hydrogen puffing.
- ✓ Analysis of drift tearing mode dominated discharges reveals presence of multiple harmonics.
- ✓ Observation of MHD frequency and amplitude modulation due by periodic gas puffs.
- ✓ Evidence of dominant role of MHD in REs loss in experiments with MHD amplitude modulated by periodic gas puffs.
- ✓ Significant reduction of REs by application of SMBI has been observed in few discharges.
- ✓ Radiative improved modes with Neon gas injection has been achieved and studied in ADITYA-U.