



IAEA FEC 2016

Contribution ID: 852

Type: Overview Poster

## Overview of Recent Experimental Results from Aditya Tokamak

*Monday, 17 October 2016 14:00 (4h 45m)*

Several experiments, related to controlled thermonuclear fusion research and highly relevant for large size tokamaks including ITER, have been carried out in ADITYA, an ohmically heated circular limiter tokamak. Repeatable plasma discharges of maximum plasma current of  $\sim 160$  kA and discharge duration beyond  $\sim 250$  ms with plasma current flattop duration of  $\sim 140$  ms has been obtained for the first time in ADITYA. The discharge reproducibility has been improved considerably with Lithium wall conditioning and improved plasma discharges are obtained by precisely controlling the plasma position. In these discharges, chord-averaged electron density  $\sim 3.0 - 4.0 \times 10^{19} \text{ m}^{-3}$  using multiple hydrogen gas puffs, electron temperature of the order of  $\sim 500 - 700$  eV have been achieved.

Novel experiments related to disruption control are carried out and disruptions, induced by hydrogen gas puffing are successfully mitigated using biased electrode and ICR pulse techniques. Runaway electrons are successfully mitigated by applying a short local vertical field (LVF) pulse. A thorough disruption database has been generated by identifying the different categories of disruption. Detailed analysis of several hundred disrupted discharges showed that the current quench time is inversely proportional to  $q_{\text{edge}}$ . Formation of current filaments are observed during most of the disruptions, which helps in identifying the cause of disruption. Apart from this, for volt-sec recovery during the plasma formation phase, low loop voltage start-up and current ramp-up experiments have been carried out using ECRH and ICRH. Successful recovery of volt-sec leads to achievement of longer plasma discharge durations. In order to achieve better coupling of lower hybrid waves to the plasma, multiple gas puffs are injected prior to the launch of lower hybrid waves. The experiments showed considerable reduction in the reflection co-efficient indicating better absorption of LH waves in plasma. In addition to that Neon gas puff assisted radiative improved confinement mode has also been achieved in ADITYA. Further, the electrode biasing experiments have shown that during transition to better confinement mode, the Drift-Alfven fluctuations are suppressed and the current profile gets modified near the edge plasma region. In this paper, all the above mentioned experiments will be discussed.

### Paper Number

OV/4-3Rb

### Country or International Organization

India

**Primary author:** Mr TANNA, Rakesh (Institute For Plasma Research)

**Co-authors:** Prof. SEN, Abhijit (Institute for Plasma Research); Mr KUMAR, Ajai (Institute for Plasma Research); Mrs DAS, Amita (Institute for Plasma Research); Mr SHUKLA, B. K. (Institute for Plasma Research); Mr RAO, C. V. S. (Institute for Plasma Research); Mr GUPTA, C.N. (Institute for Plasma Research); Mrs CHAVDA,

Chhaya (Institute for Plasma Research); Mr RAJU, D. (Institute for Plasma Research); Prof. BORA, DHIRAJ (Institute for Plasma Research); Mr SANGWAN, Deepak (Institute for Plasma Research); PRAVEENLAL, E. V. (Institute for Plasma Research); Ms RAJ, Harshita (Institute for Plasma Research); Mr RAVAL, J. V. (Institute for Plasma Research); Mr THOMAS, Jinto (Institute for Plasma Research); Mr GHOSH, Joydeep (Institute for Plasma Research, Bhat, Gandhinagar 382428, India); Mr PATEL, K. M. (Institute for Plasma Research); Mr SHAH, K. S. (Institute for Plasma Research); Mr SATHYANARAYANA, K. (Institute for Plasma Research); Mr JADEJA, Kumar A. (Institute for Plasma Research); Mrs TAHILLIANI, Kumudni (Institute for Plasma Research); Mr CHOWDHURI, M. B. (Institute for Plasma Research); Mr MAKWANA, M. N. (Institute for Plasma Research); Mr GOPALAKRISHNA, M. V. (Institute for Plasma Research); Mr PATEL, N. C. (Institute for Plasma Research); Mrs RAMAIYA, N. (Institute for Plasma Research); Mr ATREY, P. K. (Institute for Plasma Research); Mr SHARMA, P. K. (Institute for Plasma Research); Mr CHATTOPADHYAY, P.K. (Institute for Plasma Research); Mr DHYANI, Pravesh (Ulsan National Institute of Science and Technology, South Korea); KAW, Predhiman (Institute for Plasma Research, India); Mr JHA, R. (Institute for Plasma Research); Mrs MANCHANDA, R. (Institute for Plasma Research); Mr BHATT, S. B. (Institute for Plasma Research); Mr JHA, S. K. (Institute for Plasma Research); Mr PATHAK, S. K. (Institute for Plasma Research); Mr BANERJEE, S. (Institute for Plasma Research); Mr KULKARNI, Sanjay (Institute for Plasma Research); Mr PATEL, Sharvil (Institute for Plasma Research); Mr PUROHIT, Shishir (Institute for Plasma Research); Mr NAGORA, Umesh (Institute for Plasma Research); Mr PANCHAL, V. K. (Institute for Plasma Research); Mr SAXENA, Y. C. (Institute for Plasma Research); Mr JOISA, Y. (Institute for Plasma Research)

**Presenter:** Mr TANNA, Rakesh (Institute For Plasma Research)

**Session Classification:** Overview Poster

**Track Classification:** OV - Overviews