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P3.019 42GHz ECRH system on Aditya Upgrade

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The Aditya tokamak has been upgraded to Aditya-U by changing its vacuum vessel from rectangular to circular to accommodate the diverter coil for shaped plasma. The tokamak has been commissioned and now operating with routine plasma experiments.

The 42GHz ECRH (Electron Cyclotron Resonance Heating) system has been integrated with the tokamak. The system is capable to deliver 500kW power for 500ms duration. The microwave source Gyrotron is installed in SST-1 tokamak hall and ~75 meter long corrugated waveguide based transmission line is laid to launch the power in Aditya-U. The ECRH system with modified layout has been integrated successfully; the burn pattern close to tokamak port ensures good Gaussian beam (mode purity > 95%) at the exit of line.

Earlier the Aditya Tokamak used to operate at lower magnetic field (Max. 1.0Tesla) and the ECRH assisted low-loop voltage plasma start-up experiments were carried out at second harmonic at variable magnetic field (0.75T to 0.85T). The normal loop voltage for Aditya during start-up is around 22V, while the successful plasma start-up assisted with ECRH has been achieved at as low loop voltage as 6V.

Now the upgraded Aditya is operated at higher magnetic field up to 1.5T. So the ECRH experiments will be carried out at fundamental harmonic. This will reduce the requirement of EC-power as the power absorption is better at fundamental harmonic. The EC power in ordinary mode will be launched from low field side and EC-assisted low-loop voltage plasma start-up and off-axis plasma heating experiments will be carried out at fundamental harmonic (magnetic field : 1.3T to 1.5T).

The paper discusses about ECRH system on Aditya-U. The detailed paper will include the latest results of ECRH assisted breakdown and Heating on Aditya-U. The second harmonic EC-assisted low loop voltage plasma start-up in Aditya will also be presented.

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