

## Edge Toroidal Rotation of Different Ions in ADITYA-U Tokamak

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Intrinsic toroidal rotation velocity (self-driven flow) are very crucial in large tokamak like ITER [1,2]. Intrinsic rotation of two different charge states of Carbon ions ( $C^{5+}$  at 529nm,  $C^{2+}$  at 464.74nm) has been studied in the edge region of ADITYA-U tokamak. In several ohmic discharges, these two lines are monitored using 1m high resolution, Czerny-Turner configuration spectrometer. The intrinsic toroidal rotation of these lines are also studied in the presence medium-Z impurity (e.g. Neon, Nitrogen and Argon) seeded discharges. In medium-Z impurity seeded discharges, the toroidal rotation of the seeded impurity ions (e.g. Neon and Argon ions) is compared with the rotation velocity of  $C^{2+}$  and  $C^{5+}$  ions. In all these scenarios, the flow of neutral Hydrogen atoms is also monitored by analysing the shift in  $H_{\alpha}$  line emission (at 656.28nm). All the measurements are done in the flat-top region of discharge. The time resolution as well as the exposure time for the spectroscopic measurement of  $C^{5+}$  ions is 30ms, while for all other spectral lines it is 20ms. It has been observed that the rotation of  $C^{5+}$  ions reverses its direction in the edge region as a result of medium-Z impurity injection (e.g. Neon, Argon).

### References:

- [1] J. E. Rice, Plasma Phys. Controlled Fusion 58, 083001 (2016).
- [2] G. Shukla et al., Nucl. Fusion 59, 106049 (2019).