

# Plasma rotation in JET.

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16-02-2006, 11.15 - 11.30 uur

## Abstract

Plasma rotation is an intensively studied topic within the field of fusion/plasma physics. Plasma rotation, the presence of toroidal/poloidal flows in fusion plasmas, is closely related to the  $\vec{E} \times \vec{B}$  velocity. A shear in this velocity is expected to be a condition for the formation of transport barriers (TBs) due to suppression of instabilities and the decorrelation of turbulent fluxes [1]. In JET *toroidal* plasma rotation, driven by neutral beam injection (NBI), is observed at velocities ranging from approximately 100 to 300 [km/s]. These observations were made using Charge eXchange Recombination Spectroscopy (CXRS), the main diagnostic technique used for plasma rotation measurements at JET. By scaling the found velocities with the thermal velocity a toroidal Mach number is found, a dimensionless quantity comparing the thermal energy and the kinetic energy associated with toroidal rotation of the plasma. In this way the velocities are put into a physical context. The resulting Mach numbers are used to investigate the possibility to characterize plasma rotation observations in JET plasmas.

## References

- [1] K.H. Burrell. *Physics of Plasmas*, 4:1499, 1997.