



## Radial transport of poloidal momentum in ASDEX Upgrade in L-mode and H-mode

Schrittwieser, R.; Mehlmann, F.; Naulin, Volker; Juul Rasmussen, Jens; Müller, H.W.; Ionita, C.; Nielsen, Anders Henry; Vianello, N.; Rohde, V.

*Publication date:*  
2012

[Link back to DTU Orbit](#)

*Citation (APA):*

Schrittwieser, R., Mehlmann, F., Naulin, V., Juul Rasmussen, J., Müller, H. W., Ionita, C., ... Rohde, V. (2012). Radial transport of poloidal momentum in ASDEX Upgrade in L-mode and H-mode. Abstract from Workshop on Electric Fields, Turbulence and Self Organization in Magnetized Plasmas (EFTSOMP 2012), Stockholm, Sweden.

---

### General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

# Radial transport of poloidal momentum in ASDEX Upgrade in L-mode and H-mode

R. Schrittwieser<sup>1</sup>, F. Mehlmann<sup>1</sup>, V. Naulin<sup>2</sup>, J.J. Rasmussen<sup>2</sup>, H.W. Müller<sup>3</sup>,  
C. Ionita<sup>1</sup>, A.H. Nielsen<sup>2</sup>, N. Vianello<sup>4</sup>, V. Rohde<sup>3</sup>, ASDEX Upgrade Team<sup>3</sup>

<sup>1</sup>*Inst. Ion Phys. & Appl. Physics, EURATOM-ÖAW Association, University Innsbruck, Austria*

<sup>2</sup>*Association EURATOM – DTU, Technical University of Denmark, Department of Physics,  
DTU Risø Campus, Roskilde, Denmark*

<sup>3</sup>*Max-Planck-Institute for Plasma Physics, EURATOM Association, Garching, Germany*

<sup>4</sup>*Consorzio RFX, Associazione Euratom-ENEA sulla Fusione, Padova, Italy*

Turbulent transport and related parameters were investigated in the SOL of ASDEX Upgrade (AUG) in L-mode and H-mode discharges. The probe head [1] carries six probe pins of 1 mm diameter and 2 mm length. One pin is radially protruding by 3 mm. With this array the poloidal and radial electric field components  $E_{\theta,r}$ , respectively, and the ion density  $n$  could be determined simultaneously. From these data in particular the radial flux of poloidal momentum,  $M_r = n v_r v_\theta = n E_\theta E_r / B_\phi^2$ , was derived ( $B_\phi$  is the toroidal magnetic field). The density  $n$  and the radial and poloidal velocity components,  $v_{r,\theta}$ , respectively, are defined as  $X = X_0 + X_{fl}$  (i.e. the stationary and the fluctuating components). Thereby the radial flux of poloidal momentum splits into various contributions [2,3] of which three are of interest to us: (i) Reynolds stress  $\mathcal{R}e = n_0 v_{r,fl} v_{\theta,fl}$ , (ii) convective momentum flux term  $v_{\theta,0} \Gamma = v_{\theta,0} n_{fl} v_{r,fl}$  and (iii) triple fluctuating term  $n_{fl} v_{r,fl} v_{\theta,fl}$ . Here we discuss the probability density functions (PDF) of these quantities, normalized to their standard deviations, for L-mode shot #23157 during its diverted phase and H-mode shot #23163. In case of H-mode discharges,  $M_r$  is calculated separately for ELM-intervals and inter-ELM intervals, i.e., in between type-I ELMs. Whereas in H-mode due to neutral beam injection (NBI) there is an external source for toroidal angular momentum, in the L-mode discharge there is only intrinsic rotation. In both cases we see radial flux of poloidal momentum but with opposite signs.

## References

- [1] C. Ionita, N. Vianello, H.W. Müller, et al., J. Plasma Fusion Res. Series 8, 413 (2009).
- [2] F. Mehlmann, C. Ionita, V. Naulin, et al., 37<sup>th</sup> EPS Conf. Plasma Phys. (Dublin, 2010), P1.1064.
- [3] J. R. Myra, D. A. Russell, D.A. D'Ippolito, Phys. Plasmas 15, 032304 (2008).