



Turbulent equipartition and the dynamics of transport barriers in electrostatic turbulence (poster)

Juul Rasmussen, J.; Naulin, V.; Nycander, J.

Published in:
Book of abstracts

Publication date:
2001

Document Version
Publisher's PDF, also known as Version of record

[Link back to DTU Orbit](#)

Citation (APA):
Juul Rasmussen, J., Naulin, V., & Nycander, J. (2001). Turbulent equipartition and the dynamics of transport barriers in electrostatic turbulence (poster). In *Book of abstracts* Risø National Laboratory, Optics and Fluid Dynamics Department.

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.

Turbulent Equipartition and the Dynamics of Transport Barriers in Electrostatic Turbulence

J. Juul Rasmussen and V. Naulin
Association EURATOM-Risø National Laboratory
OFD-128, Risø, DK-4000 Roskilde, Denmark

J. Nycander
University of Stockholm,
S-172 90 Stockholm, Sweden

The formation of transport barriers and the related intermittent turbulent fluxes are investigated for flux driven interchange mode turbulence. Numerical simulations on a bounded domain show that the turbulence leads to an equipartition of Lagrangian invariants by mixing. The averaged equilibrium quantities approach the profiles predicted by turbulent equipartition (TEP). However, below a critical aspect ratio $\alpha = L_y/L_x \approx 3.8$ large scale poloidal - so-called zonal - flows are found to develop. These flows, which are strongly sheared and often only develops in a part of the domain, quenches the turbulence and acts as effective barriers for transport and mixing. For long periods the system is very quiescent. As there is no longer sufficient mixing by the turbulence to maintain the TEP profiles, they start to steepen via the diffusive inflow of heat from the heated boundary, at the same time scale the zonal flows are damped by the viscosity. This leads to the appearance of sporadic flux bursts, which are observed to occur at somewhat random intervals. The time scale of the quiescent periods between the burst is related to the viscous time scale.