

# *ETG Turbulence and Anomalous Transport in NSTX*

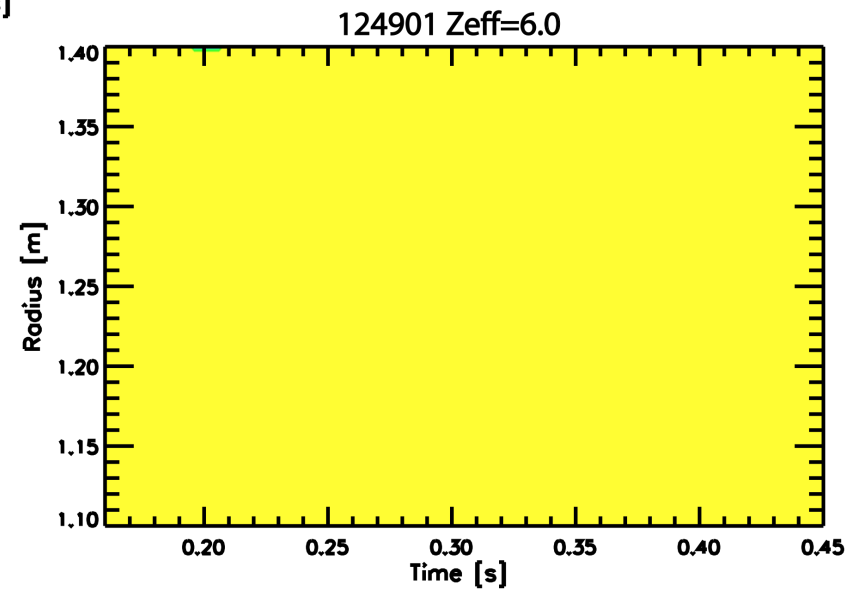
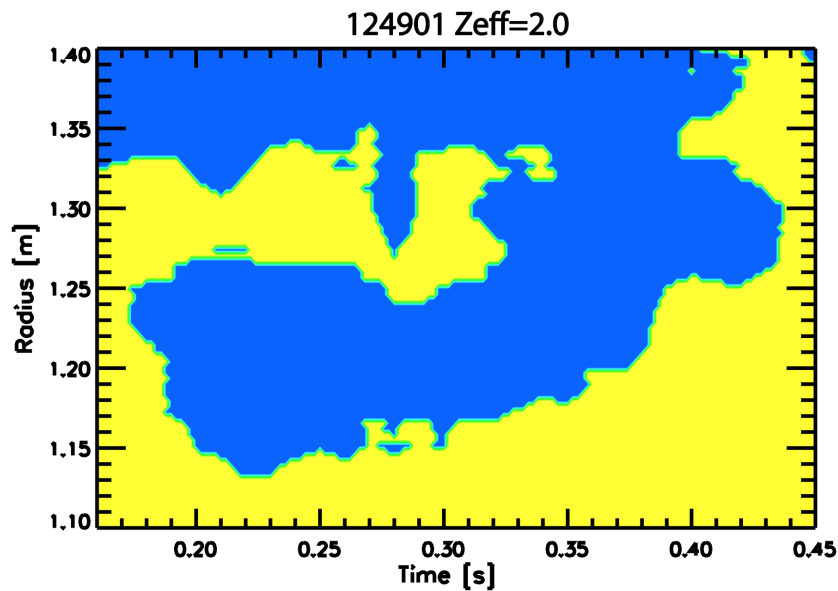
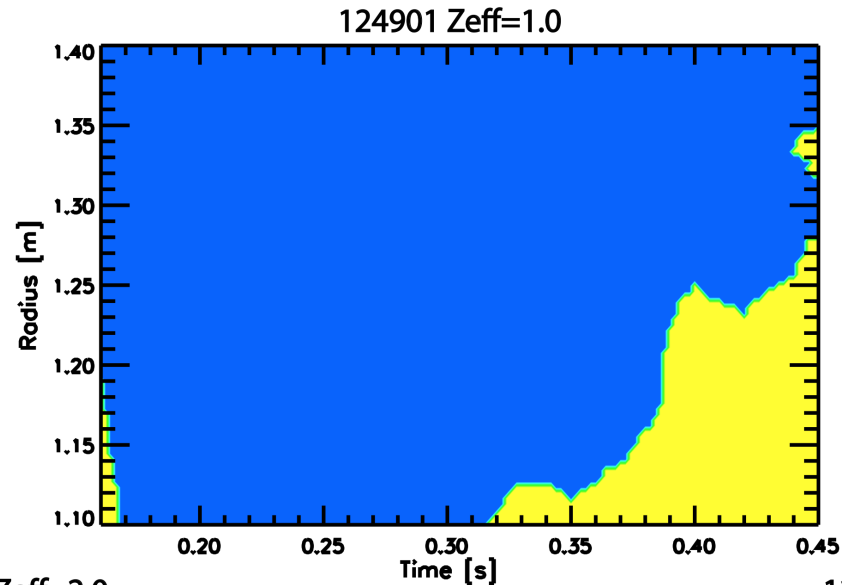
*(Milestone R11-1, ITPA TC-10)*

E. Mazzucato and the NSTX Transport & Turbulence team

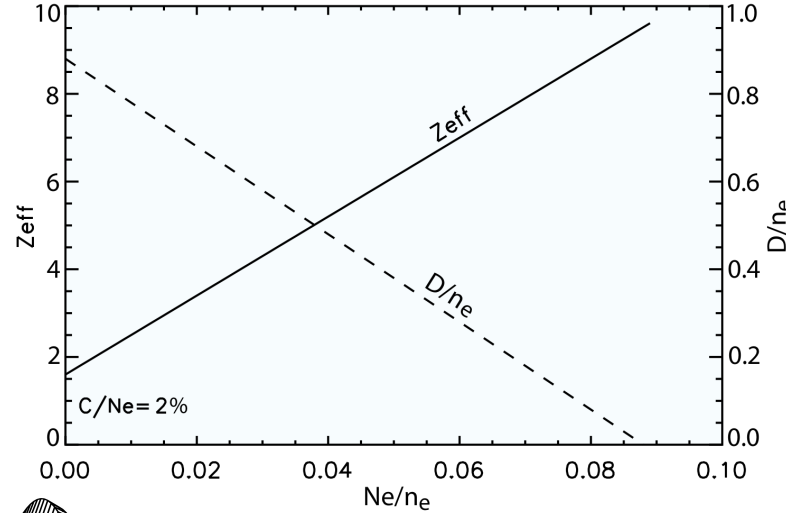
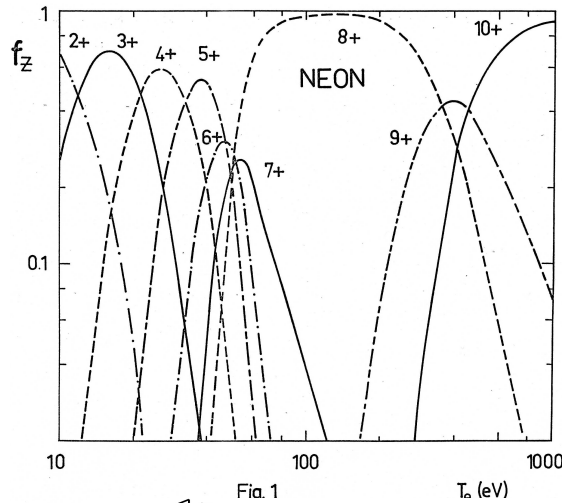
- *Various theories and numerical simulations support the conjecture that anomalous electron transport may arise from a turbulence driven by the Electron Temperature Gradient (ETG).*
- *During the past three years, we have conducted a series of experiments indicating the existence of turbulent fluctuations with an electron gyro-scale.*
- *While we have found some evidence that these fluctuations are indeed driven by the electron temperature gradient, we still do not know whether they are responsible for the anomalous electron transport in NSTX plasmas.*
- *The goal of this proposal is:*
  - *to collect further evidence on the ETG nature of these fluctuations;*
  - *to clarify their role in the transport of electron energy in NSTX.*
- *This will be achieved by performing fluctuation measurements in plasmas with different values of  $Z_{\text{eff}}$ .*

- *XP stems from the the suppression of the ETG mode by large values of  $Z_{eff}$*

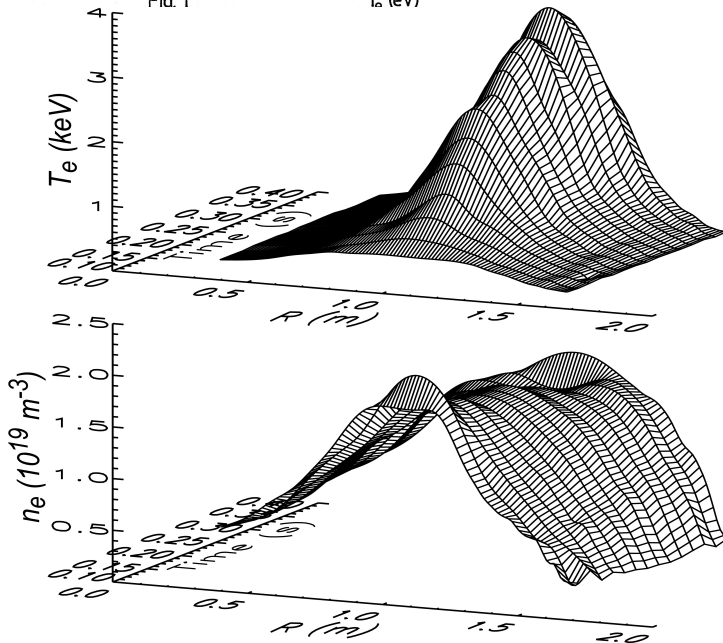
$$(R / L_{T_e})_{crit} = (1 + Z_{eff} T_e / T_i)(1.3 + 1.9s / q)(1 - 1.5\varepsilon)$$



# Change $Z_{eff}$ by varying the concentration of Neon in D-plasmas



5% Ne + 2% C  
result in  $Z_{eff} = 6$   
and 40% D



Use of HHFW heating because of its ability to produce peaked  $T_e$  profiles

**XP will require a minimum of 1 run-day**