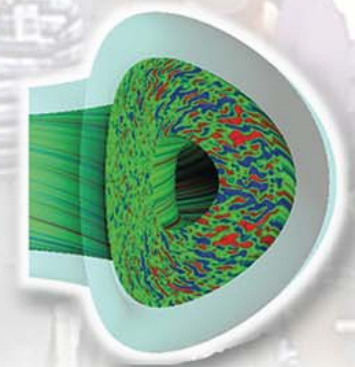
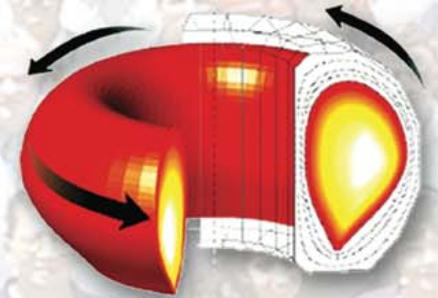


Z-Dependence of Impurity Transport in High Confinement Plasmas

By
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Workshop

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High-Confinement Plasmas Show a Tendency for High-Z Impurity Accumulation

Goal:

Provide key transport data needed to evaluate compatibility of potential first wall materials and impurities for radiation enhancement with AT operating modes

Tools:

SPRED VUV Spectroscopy

Charge Exchange Recombination (CER) Spectroscopy

Z_{eff} Array

Bolometer Array

Impurity Pellet Injector

Electron Cyclotron Heating

Fast Wave Heating

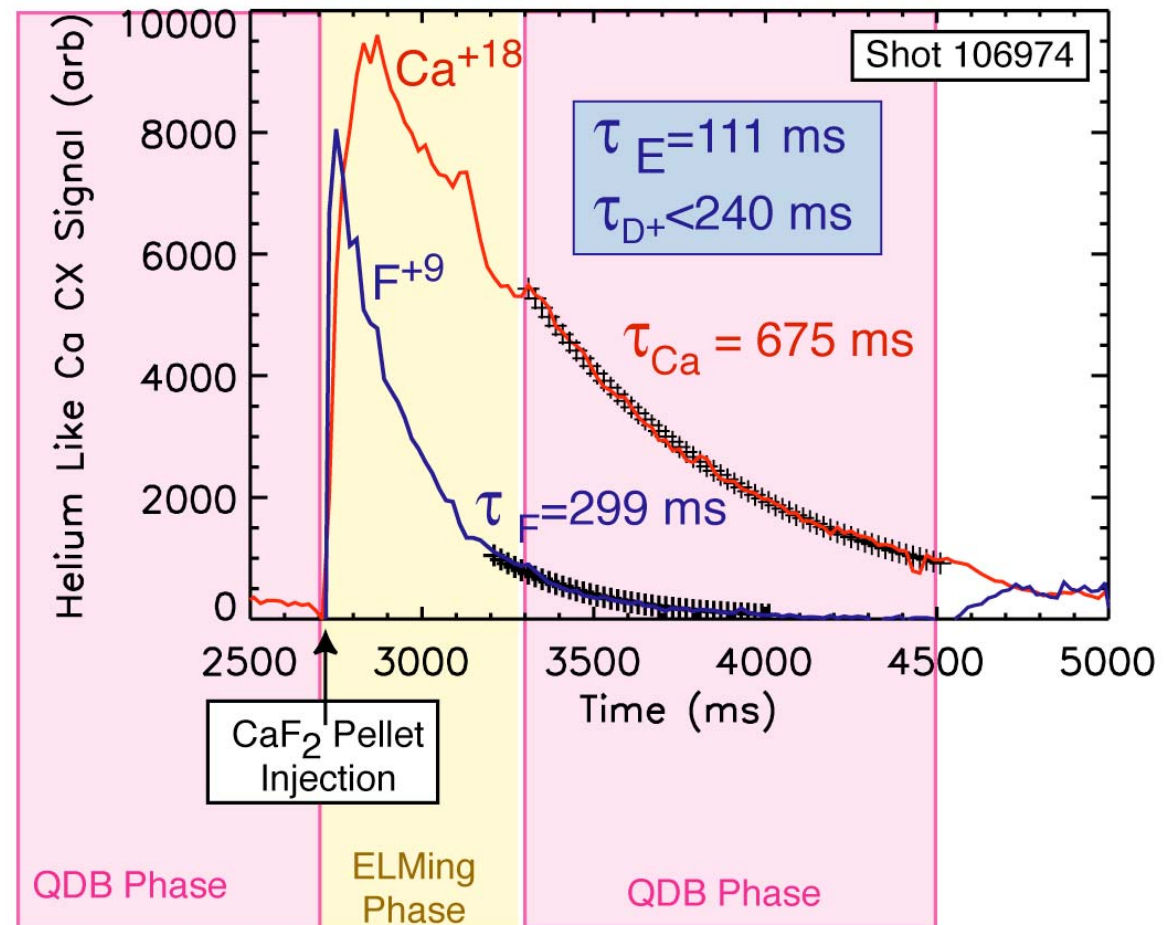
QH-Mode: Calcium (Z=20) Confinement Time more than Twice that of Flourine (Z=9) following CaF₂ Injection

CaF₂ powder injected into QH mode using the Impurity Pellet Injector

Ca:
Dominant Charge State +18
F:
Dominant Charge State +9

D⁺ confinement from D⁺ content over beam input =240 ms

Calcium and Flourine Confinement Time



Transport properties needed for prediction of core radiation, core dilution, mantle radiation

Impurity transport data contribute to answering these important design/physics issues:

Will AT plasmas survive high-Z metal walls?

Can significant mantle radiation be achieved without degrading core performance?

Can impurity accumulation be mitigated using central RF heating?

Is impurity transport dominated by neoclassical physics or turbulence physics?