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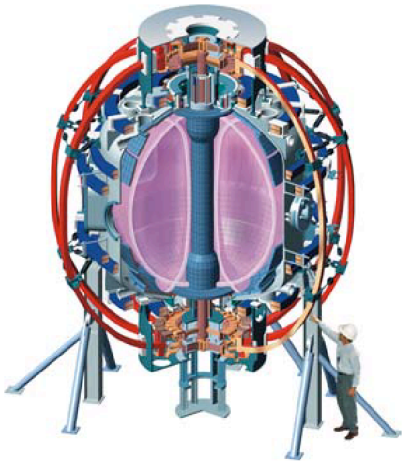
Overview of

16th International Conference on Plasma Surface Interactions in Controlled Fusion Devices

Portland Maine, May 24-28, 2004



Presenters: H.W.Kugel,

D. Stotler, V.Soukhanovskii,

C.H.Skinner, R.Maingi

PPPL PRINCETON PLASMA PHYSICS LABORATORY

H. W. Kugel

Columbia U
Comp-X
General Atomics
INEL
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Kyushu Tokai U
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JAERI
Ioffe Inst
TRINITI
KBSI
KAIST
ENEA, Frascati
CEA, Cadarache
IPP, Jülich
IPP, Garching
U Quebec

Introduction

- **Participation**
  - **Oral Abstracts: ~ 63**
  - **Poster Abstracts: ~ 204**
  - **Presentations: ~ 267 - no shows (no VISA's)**

- **Scientific Assessment**
  - **The sessions were very engrossing and well attended**
  - **Some progress in ITER related issues (Divertor PFCs, detritification,..)**

Outline of Overview

H.W. Kugel	Introduction Session 2&3: Material Migration 1&2 Session 8: Transient Loading on PFC's
D. Stotler	PSI Modeling and Theory update
V. Soukhanovskii	Session 4: Divertor Physics and Parallel Transport Session 6: Divertor Physics
C. H. Skinner	Session 7: Tritium Retention Special ITER Session Session 13 &14: Surface Interaction Physics I&II
R. Maingi	Session 9: ELM Physics Session 10: ELM Physics and Control Session 11&12: Long-Pulse and enhanced Operation I&II

From Sessions 2, 3, 8, & Posters: Material Migration,Transient Loading on PFC's, Wall Conditioning

- **Material Migration in Tokamaks, Guy Mathews**
  - JET hydrocarbons
    - 99.8% of have sticking probability of 0.92
    - 0.2% sticking probability of ~10^{-3}
    - implies high re-erosion yield
    - implies ITER potential for large T retention (even if W after C)
  - In C-MOD, high Z, prompt re-deposition helps high Z divertor
  - Impurity seeding impacts erosion (positively/ negatively).
    - PISCES data indicates small %Be entirely suppresses C erosion (CD band)
    - In ASDEX, W eroded by impurities & mainly in limiter phase
  - ITER simulation of Materials, Neutrons, & Ions

    Be: 30g per ITER pulse, 1.8 Tons/yr(1m^3), 1yr wall life

    W: 20g per ITER pulse, 1.3 Tons/yr (0.07 $m^{3)}$, 20 yr wall life

    Issue: how large a high-Z flake from upper divertor could be tolerated

From Sessions 2, 3, 8, & Posters: Material Migration,Transient Loading on PFC's, Wall Conditioning

- ***Tungsten Redistribution Patterns in ASDEX Upgrade***, K. Kreiger,..(sputtering mostly of Center Column due to light ions; 90% local redeposits on Center Column)
- ***A New Look at JET Operation With Be As Plasma Facing Material***, A. Loarte,..(H-modes maintained with molten Be divertor target; yielded better gettering)
- ***Carbon Erosion and a:C-H layer Formation at ASDEX Upgrade***, V. Rohne,(65% of First Wall consists of W but core C only reduced by factor of 2)
- ***C-13 Transport Studies in L-Mode Divertor Plasmas on DIII-D***, S. Allen,…(injected 300 Tℓ of $^{13}CH_4$; measured $^{13}CH_4$ in exhaust & in tiles; 30% of C swept toward Inner Divertor by fast plasma flows in SOL)
- ***Chemical Erosion of ATJ Graphite by Low Energy D_2^+ Impact***, F.Meyer,.. (30-130 eV/amu; CD_4 dominant at RM temp; with increasing temp, CD_4 decreased & C_2D_2 increased)
- ***Hydrogen Recycling from Solid and Liquid Lithium Surfaces***, Y. Hirooka,…(@ 10 eV, the sticking coefficients for plasma species H^+_3, H^+_2, H^+, H^0 are 0.37 @100 °C, 0.51@290 °C; but for molecular H_2, only $3.2x10^{-5}$ to $3.2x10^{-3}$ -sensitive to surface conditions)
- ***Analyzes of Boronized Walls and Operation in LHD***, N. Ashikawa,..(Oxygen buildup at C interface & on front surface during following HeGDC)