

Universität Stuttgart



## Impurity transport (I<sub>da</sub>)

- **How to distinguish flux and transport** : intrinsic impurity (transport+flux), injected impurity (transport, LBO[shallow penetration], TESPEL[deep penetration])
- $\Gamma = D \text{ grad-}n + V n$
- $D$ : sensitive to  $T$  ? ,  $V n$  : sensitive to  $E_r$  (positive  $E_r$  tends to reduce inward pinch, prevents radiation collapse),  $\text{grad-}T_i$
- DB requirements : see McCarthy's ITC/ISHW presentation, **registration of shots with accumulation  $\rightarrow$  base for modelling**

## Important issue

- **Influx**: dependence of  $n$  (collisionality effect), effect of ergodic magnetic field
- **Transport** : diffusion, convection  $V(E_r, \text{grad } T)$ ,  **$E_r$  modified by magnetic topology ?**

## Future collaboration

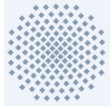
LBO : TJ-II, LHD, H-J: H.Funaba++

TESPEL : Tamura

Modelling : how much NC transport can explain the impurity transport? Yokoyama++

Comparison study : what's next after McCarthy's summary talk ?

Impact of ELM ? (documentation might be possible for W7-AS, outward shift of  $R_{ax} \sim 4\text{m}$  in LHD also possible to activate ELM)



## Impurity transport (Tamura)

- Impurity transport study by using TESPEL in LHD
  - deposition of tracer impurity inside the IDB region
  - Application to NSTX, L mode, H mode plasmas

### Comments

- Impurity accumulation is reduced with local additional heating (ECH) @JET
- Controllability of impurity accumulation in helical systems by temperature gradient, potential gradient ( $E_r$ )
- LBO in HDH (W7-AS), PS regime:
- No temperature screening from NC theory, but experimentally there seems to exist...

## Impurity hole (Yoshinuma)

### Comments

- highly anisotropic pressure plasma
- Impurity hole without a fast toroidal rotation ? No.
- How much anisotropic pressure affect the impurity transport and toroidal rotation ?
- Negative  $E_r$  predicted from pure NC, contradiction
- Hydrogen density profile ~ peaked
- Upper limit of the density for impurity hole appearance ? Critical  $T_i$  gradient ?