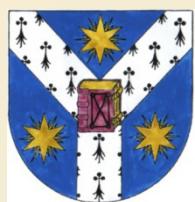


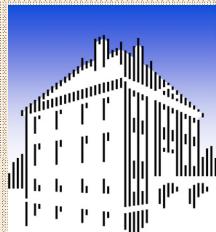
# **Characterization of Pilot-PSI plasma beam by electrical methods**

**C. Costin, M. L. Solomon, V. Anita, L. Sirghi, G. Popa**



*Faculty of Physics, "Al. I. Cuza" University Iasi  
Association EURATOM – MEdC  
ROMANIA*

# Collaboration



**PSI – J. Rapp group leader**  
**R. S. Al, H. J. van der Meiden,**  
**M. van der Pool, G. J. van Rooij**

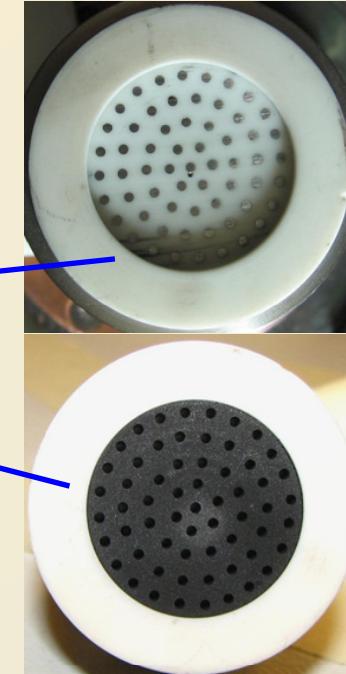
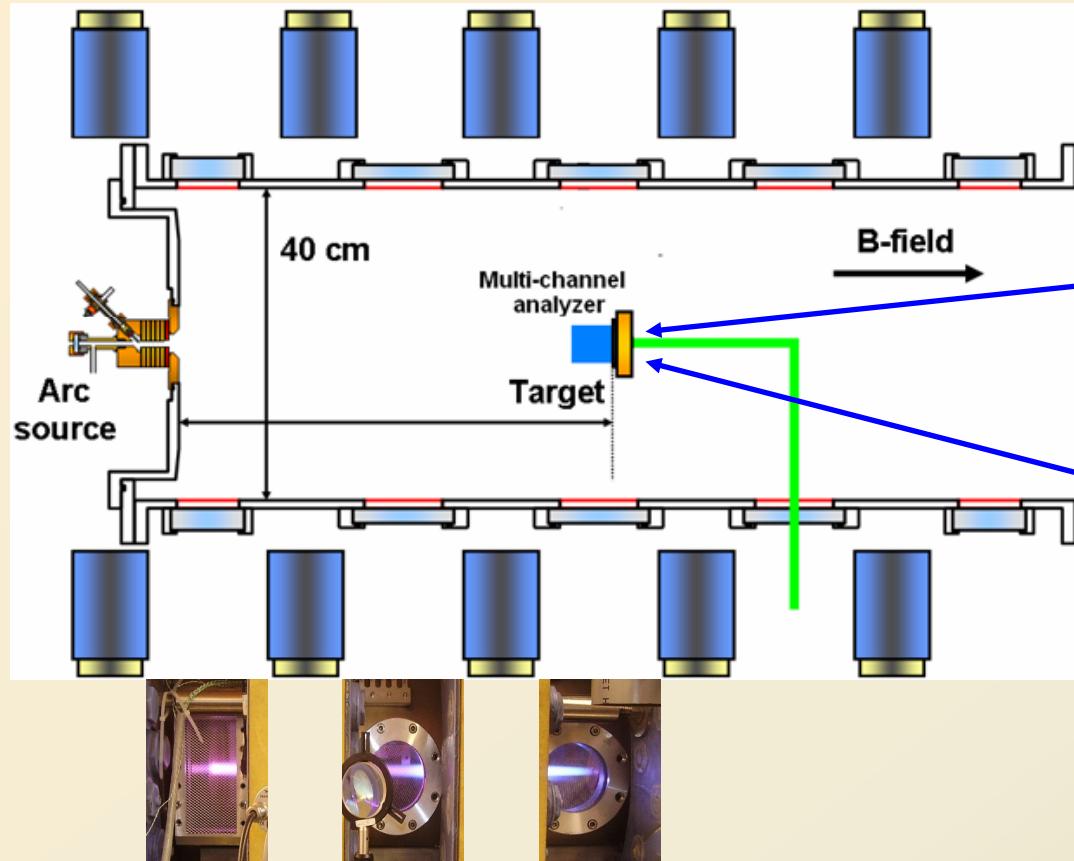
*FOM-Institute for Plasma Physics Rijnhuizen  
Association EURATOM-FOM, Nieuwegein, The Netherlands*

## EFDA WP2010 PWI TF

WP10-PWI-04-04-01      *Baseline Support*

“Measurement and modelling of chemical erosion of low-Z materials in tokamaks for plasmas at low temperatures including the impact of seeding gases”

# Experimental set-up



MCA  
61 channels

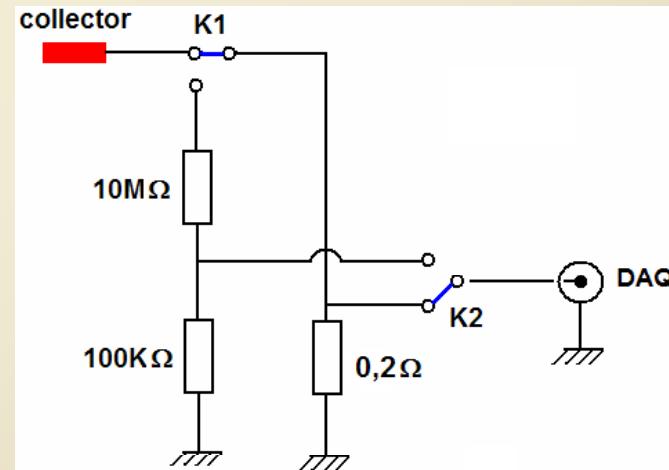
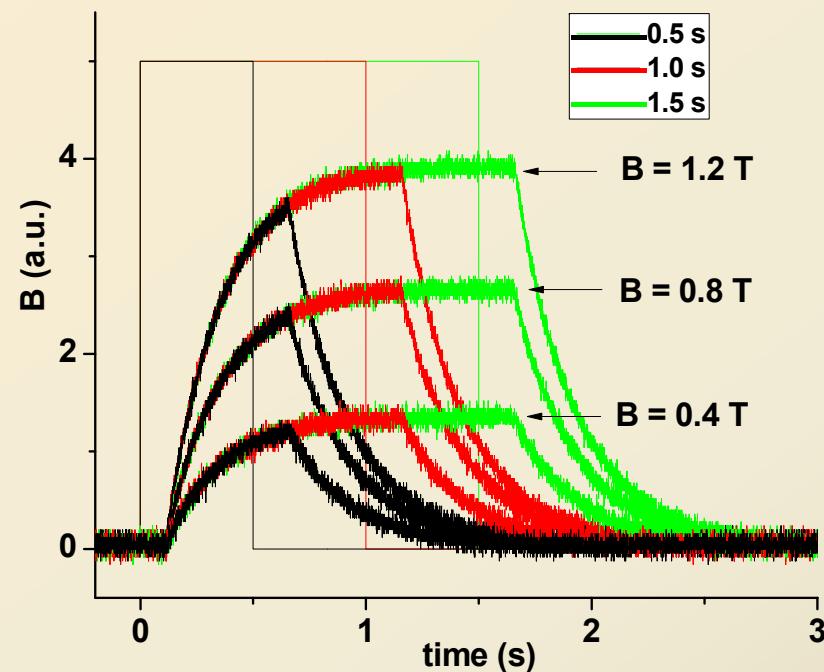
Gas:  $H_2$   
Gas flow: 3 slm  
Discharge current:  $I_d = 80 - 140$  A  
Magnetic field:  $B = 0.4$  and  $0.8$  T  
Pressure 5 Pa



# Electrical measurements

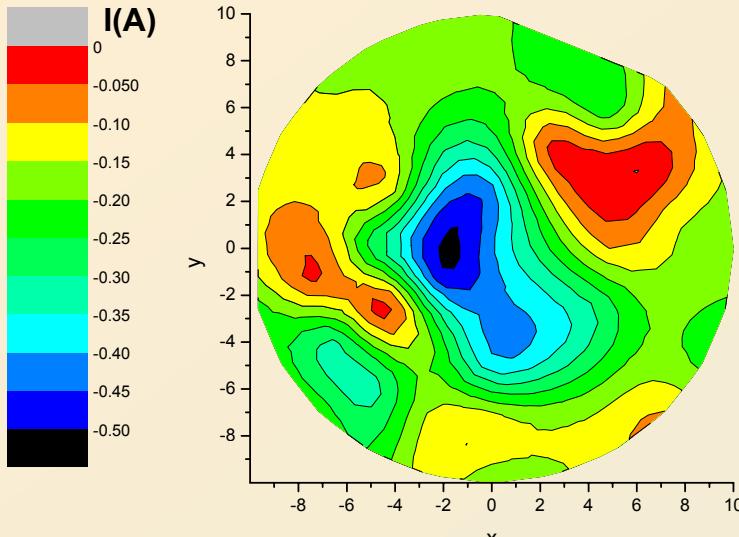
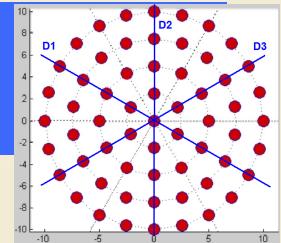
## 2D time-dependent distributions

- Floating potential
- Electrical current (grounded collectors)

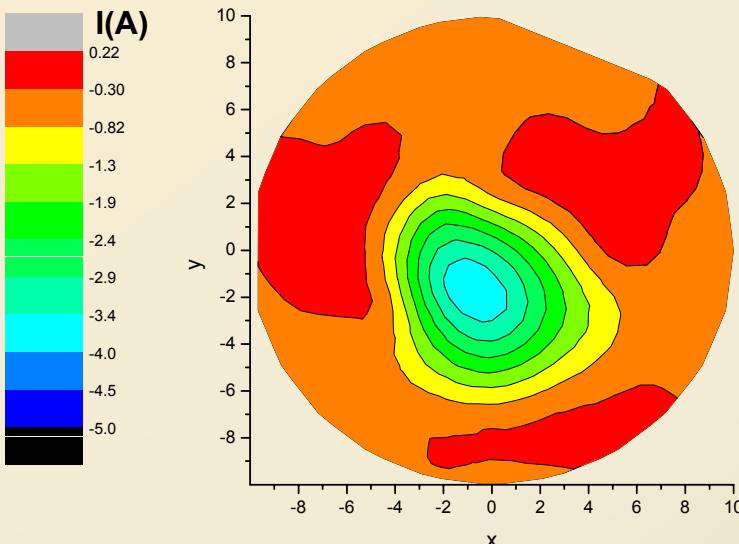
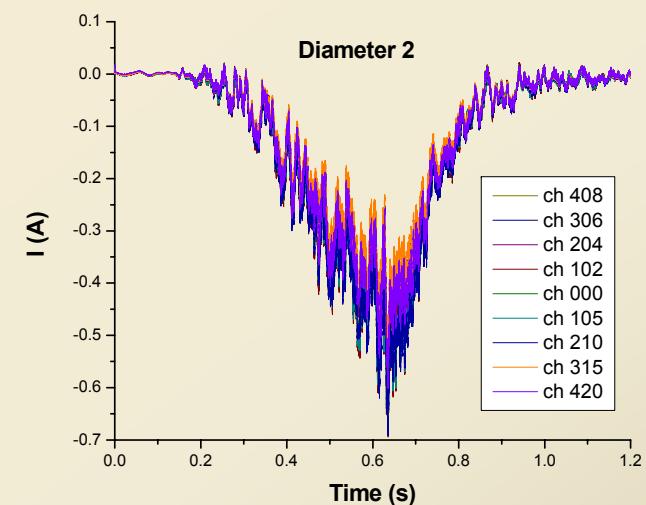


# Current measurements

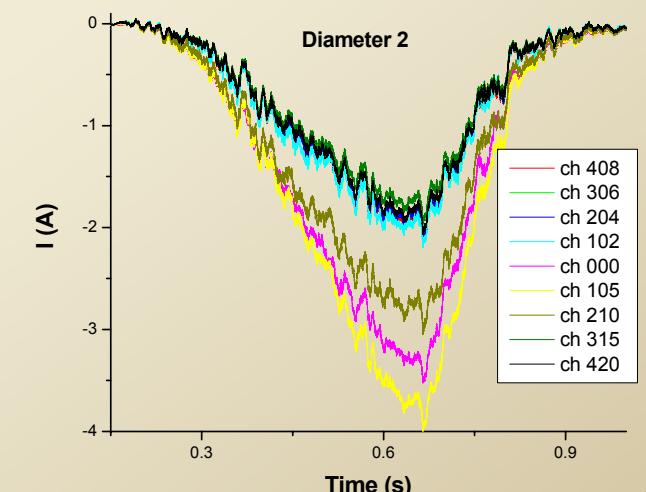
without carbon plate  $I_d = 140 \text{ A}$



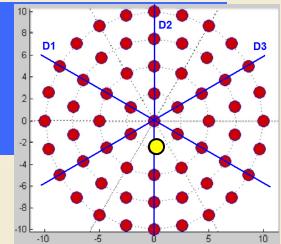
$$B = 0.4 \text{ T}$$



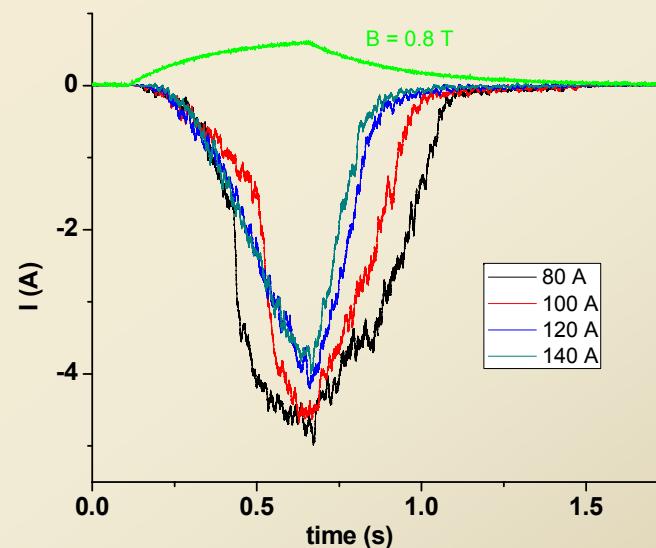
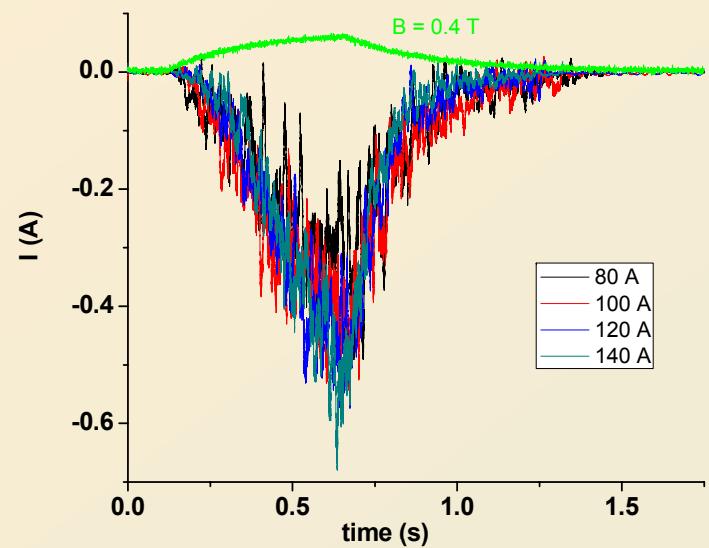
$$B = 0.8 \text{ T}$$



# Current measurements

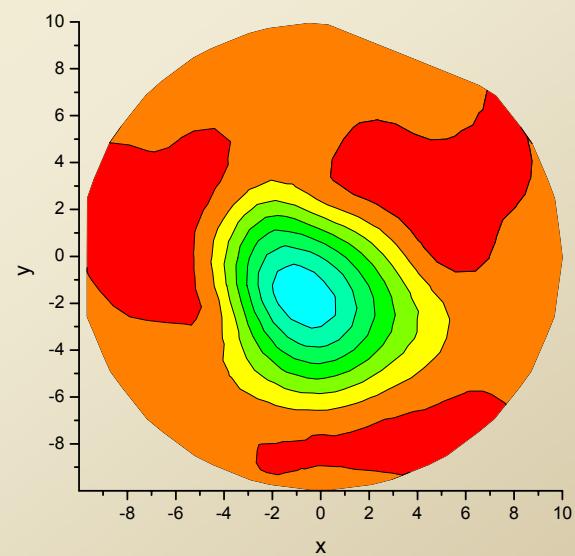
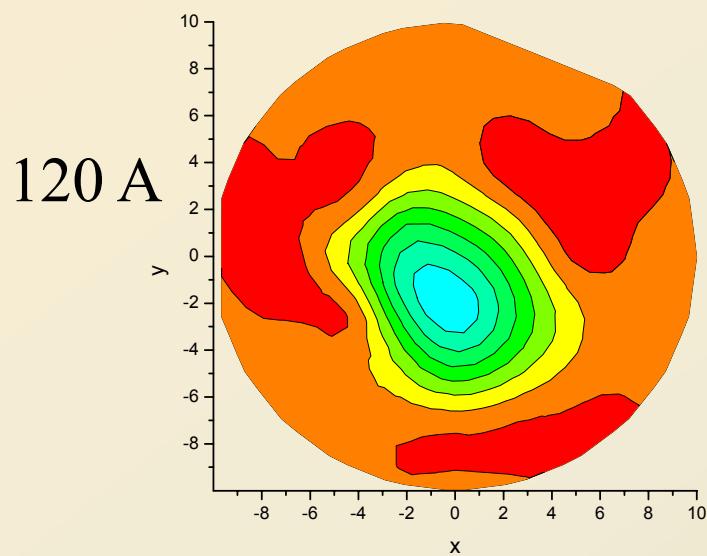
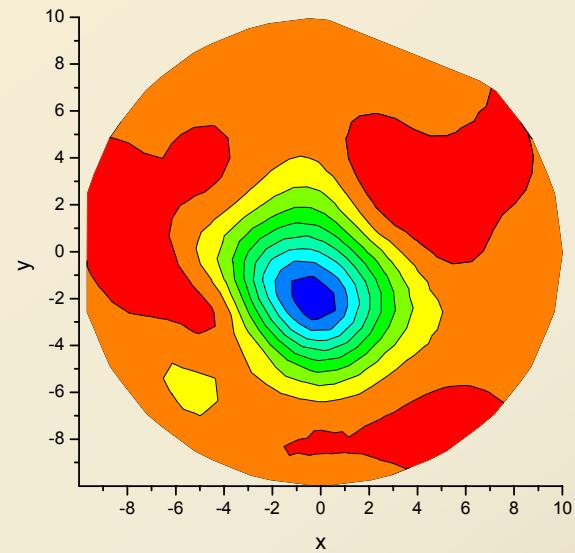
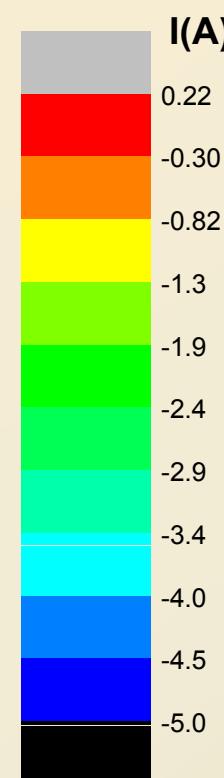
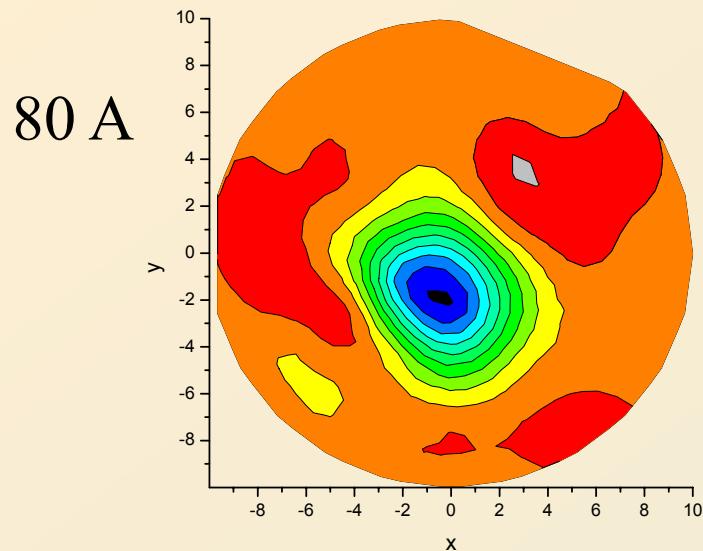


without carbon plate ch 105



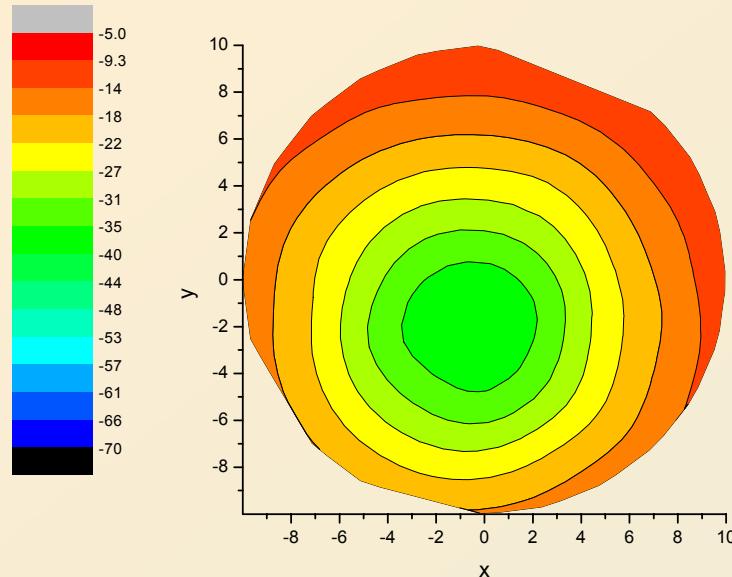
# Current measurements

without carbon plate  $B = 0.8 \text{ T}$

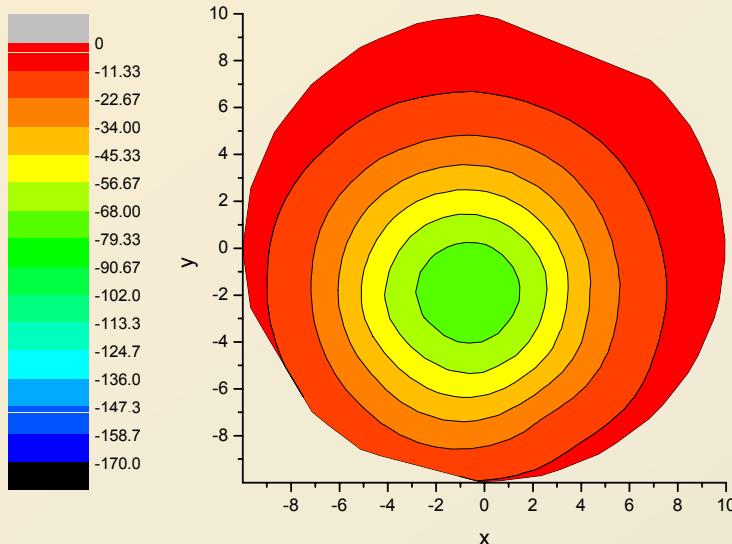


# Floating potential

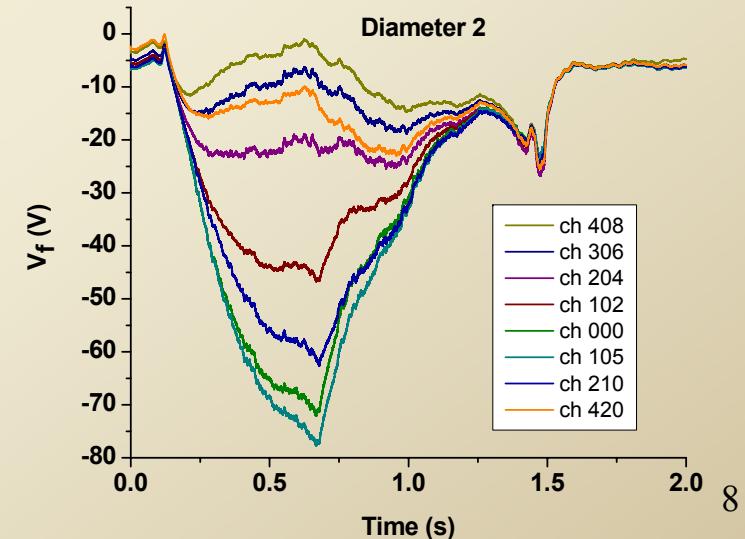
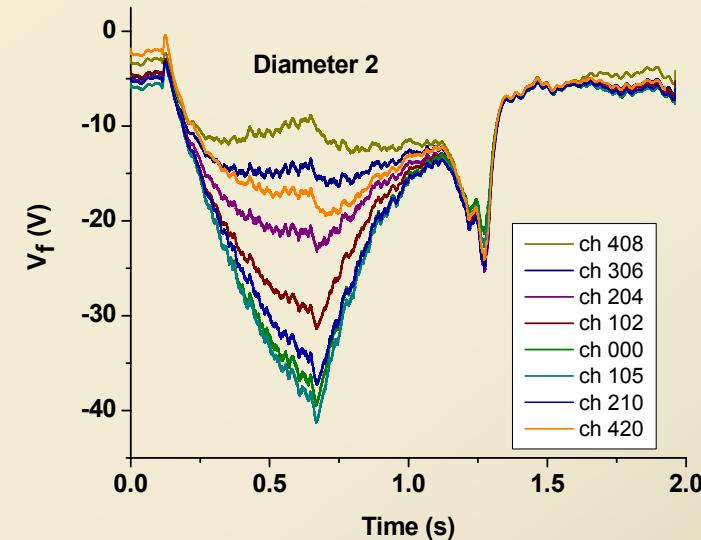
without carbon plate  $I_d = 100 \text{ A}$



$B = 0.4 \text{ T}$

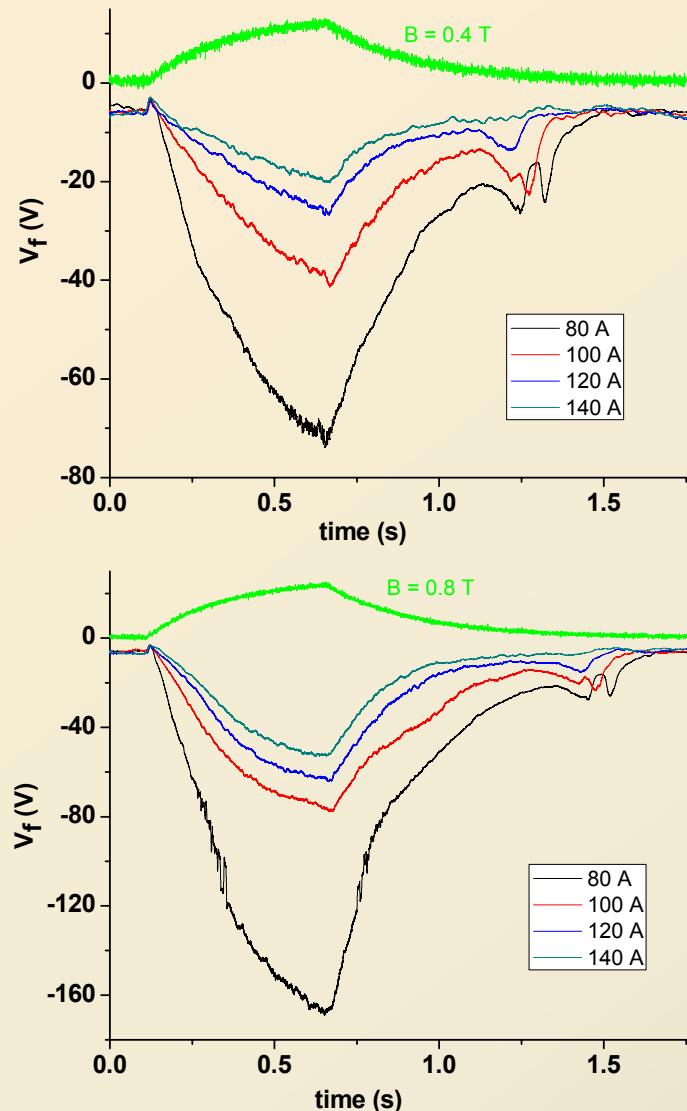


$B = 0.8 \text{ T}$

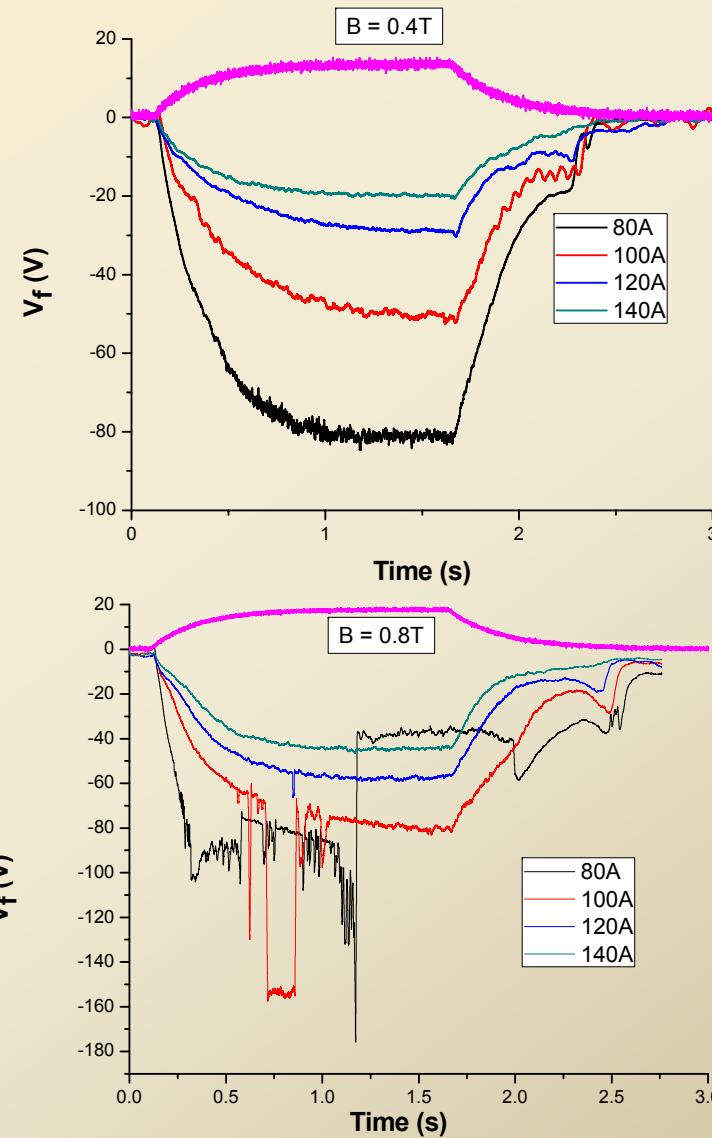


# Floating potential / ch105

without carbon plate



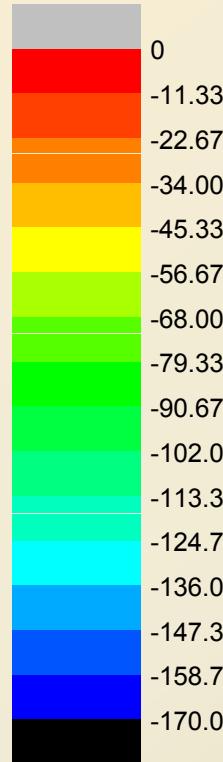
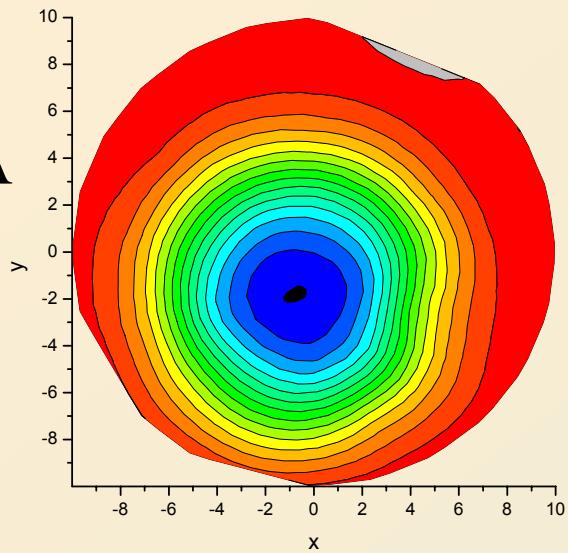
floating carbon plate



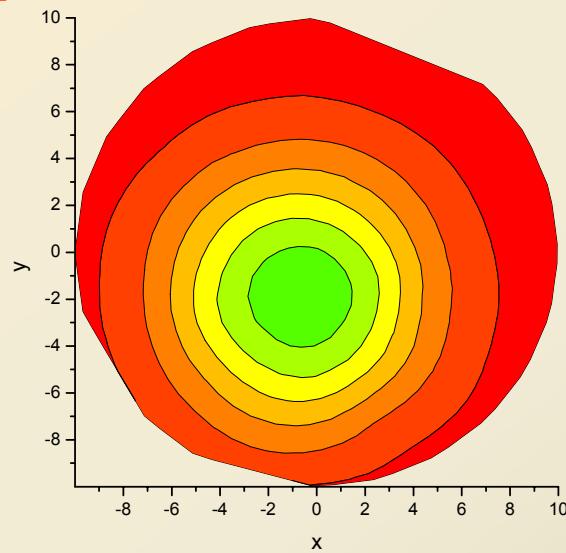
## Floating potential, $B = 0.8$ T

without carbon plate

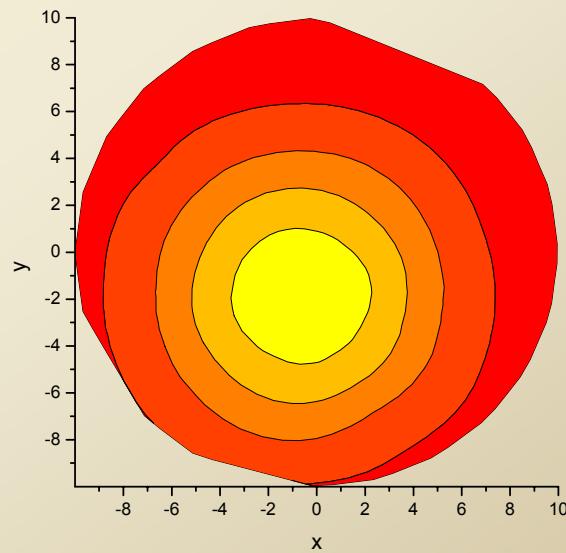
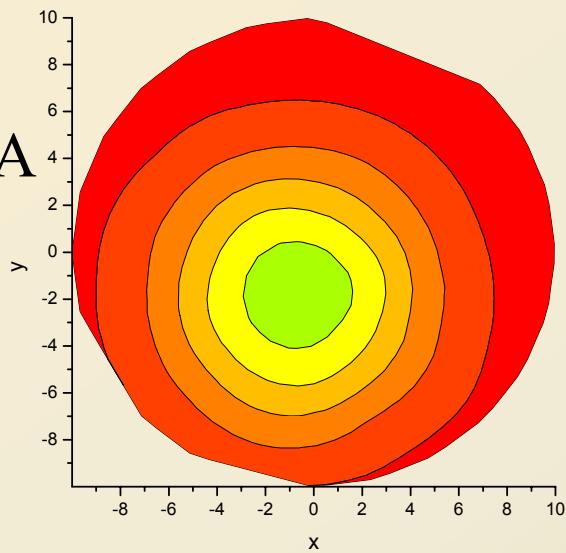
80 A



100 A

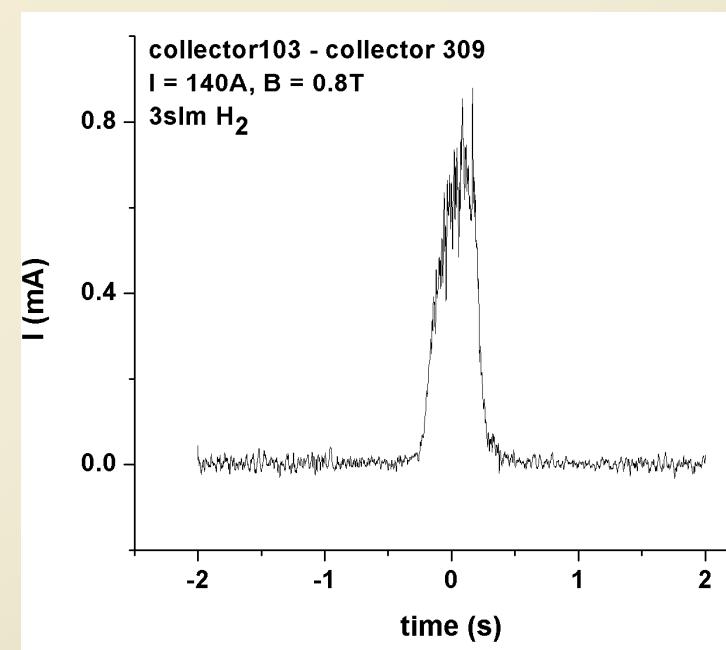
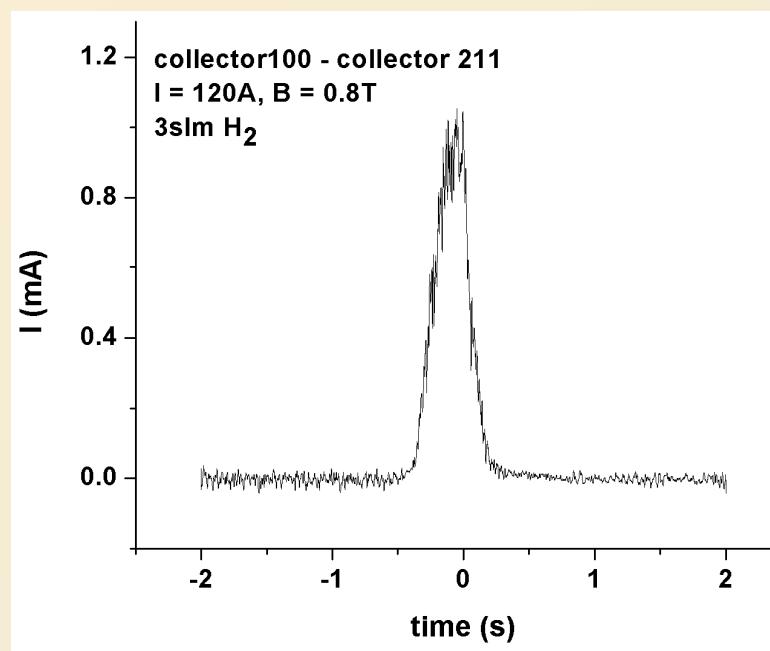
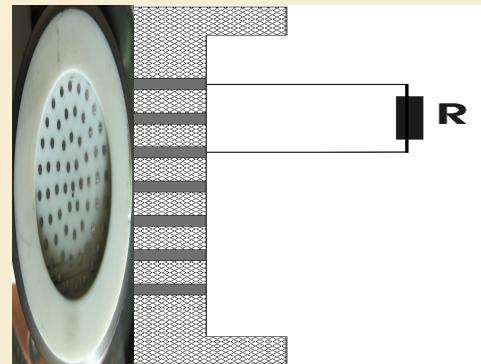


120 A



10

# Currents flowing between two collectors

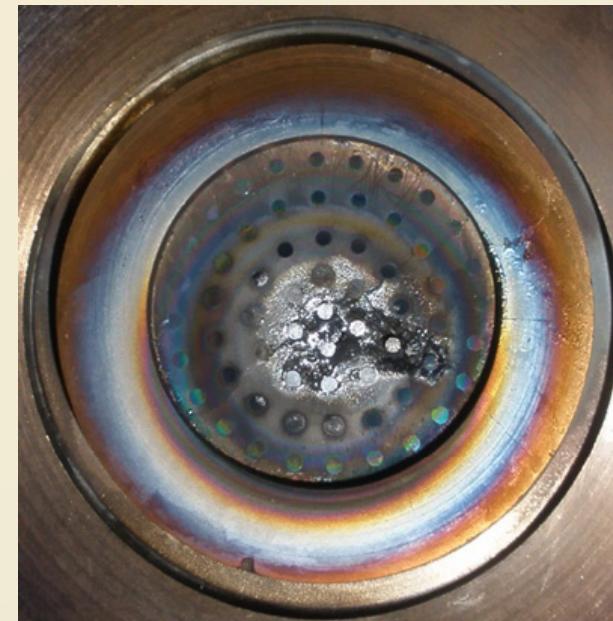


## Influence of sputtering/deposition process

initial

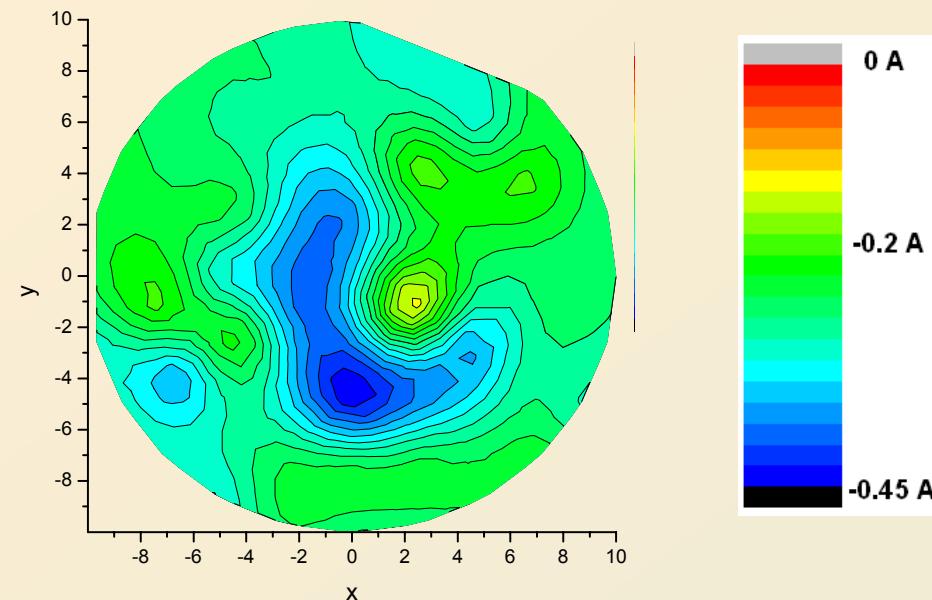


after two hours

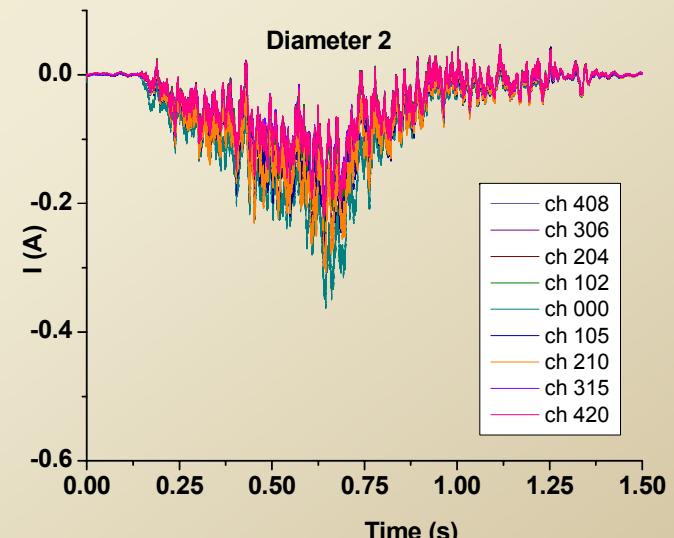
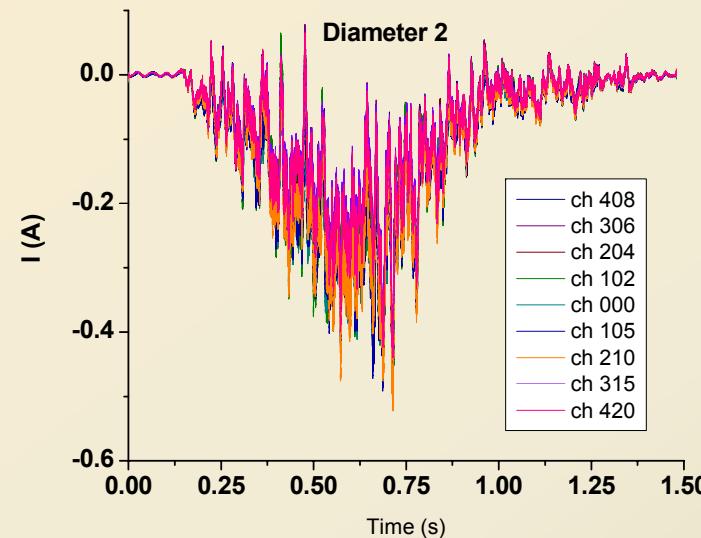
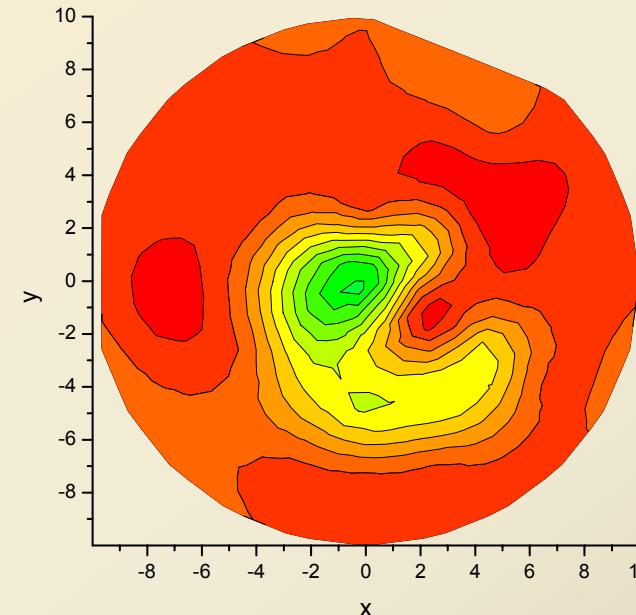


# Influence of sputtering/deposition process

initial



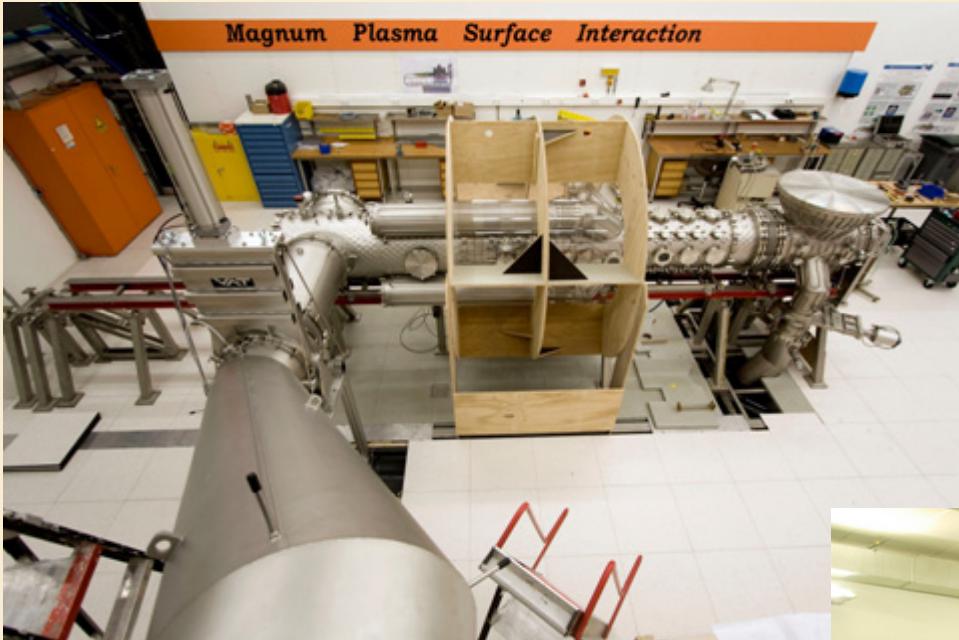
after two hours



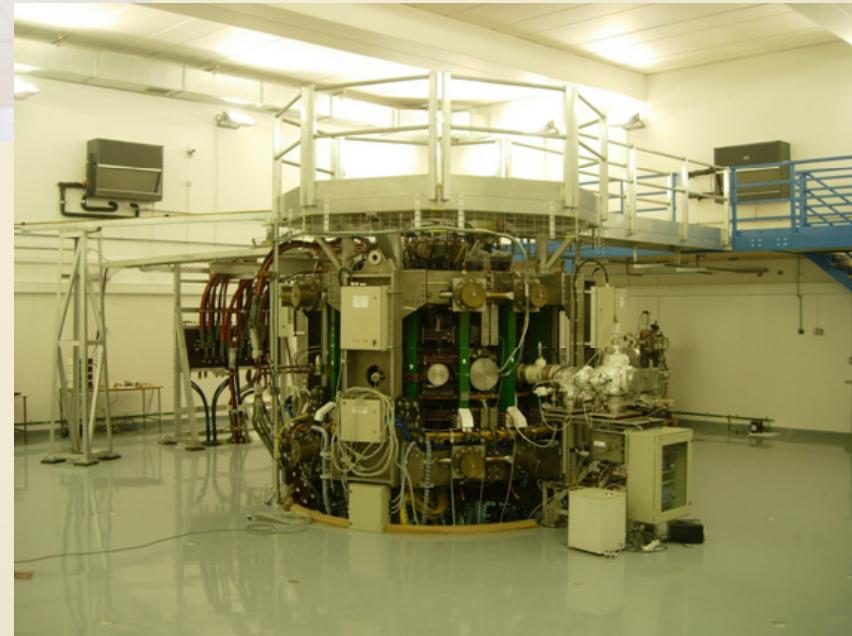
## Conclusions

- ✓ MCA measurements at Pilot-PSI target for 2D distribution
  - current
  - floating potential
- ✓ Measured currents strongly increase with the magnetic field strength.
- ✓ Floating potential has cylindrical symmetry with strong negative values in the center of the plasma beam.
- ✓ Currents flowing between different collectors are of the order of millamps.

# Future collaborations



**Magnum-PSI**  
FOM, The Netherlands



**COMPASS tokamak**  
IPP Prague, Czech Republic