PAUL SCHERRER INSTITUT

CYCLOTORNS'10
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Disturbance effects caused by RF power leaking out from cavities in the PSI Ringcyclotron

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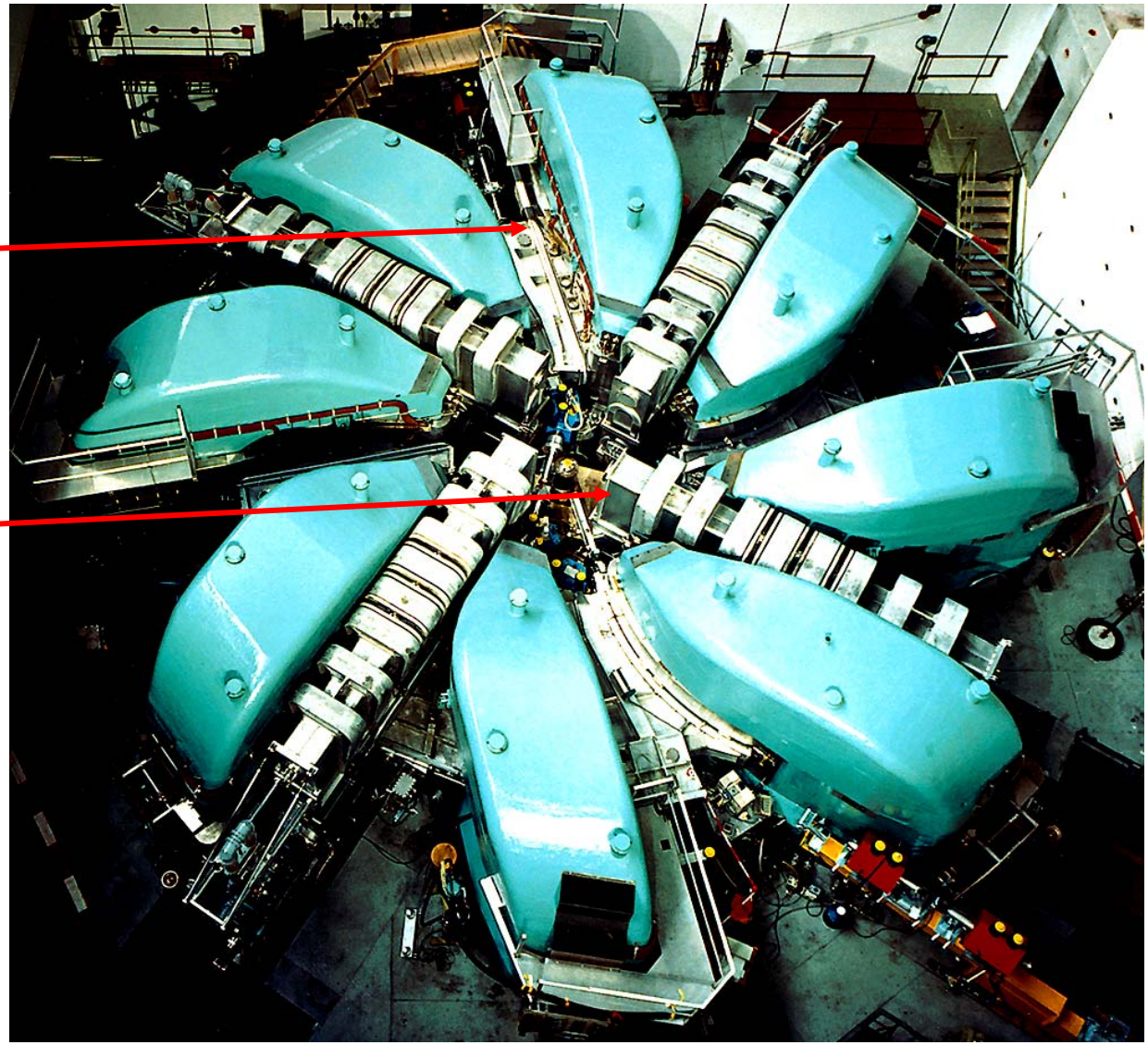
PSI Villigen, Switzerland

Upgrade of the PSI 590 MeV Ringcyclotron

RF-Flattop System:

Flattop Cavity
500 kV 150MHz, **1.9m**
Half Wave Resonator

Main Cavity
750 kV 50MHz, **5.2m**
Quarter Wave Resonator



Upgrade of the PSI 590 MeV Ringcyclotron

RF-Flattop System:

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850 kV 50MHz, **5.2m**
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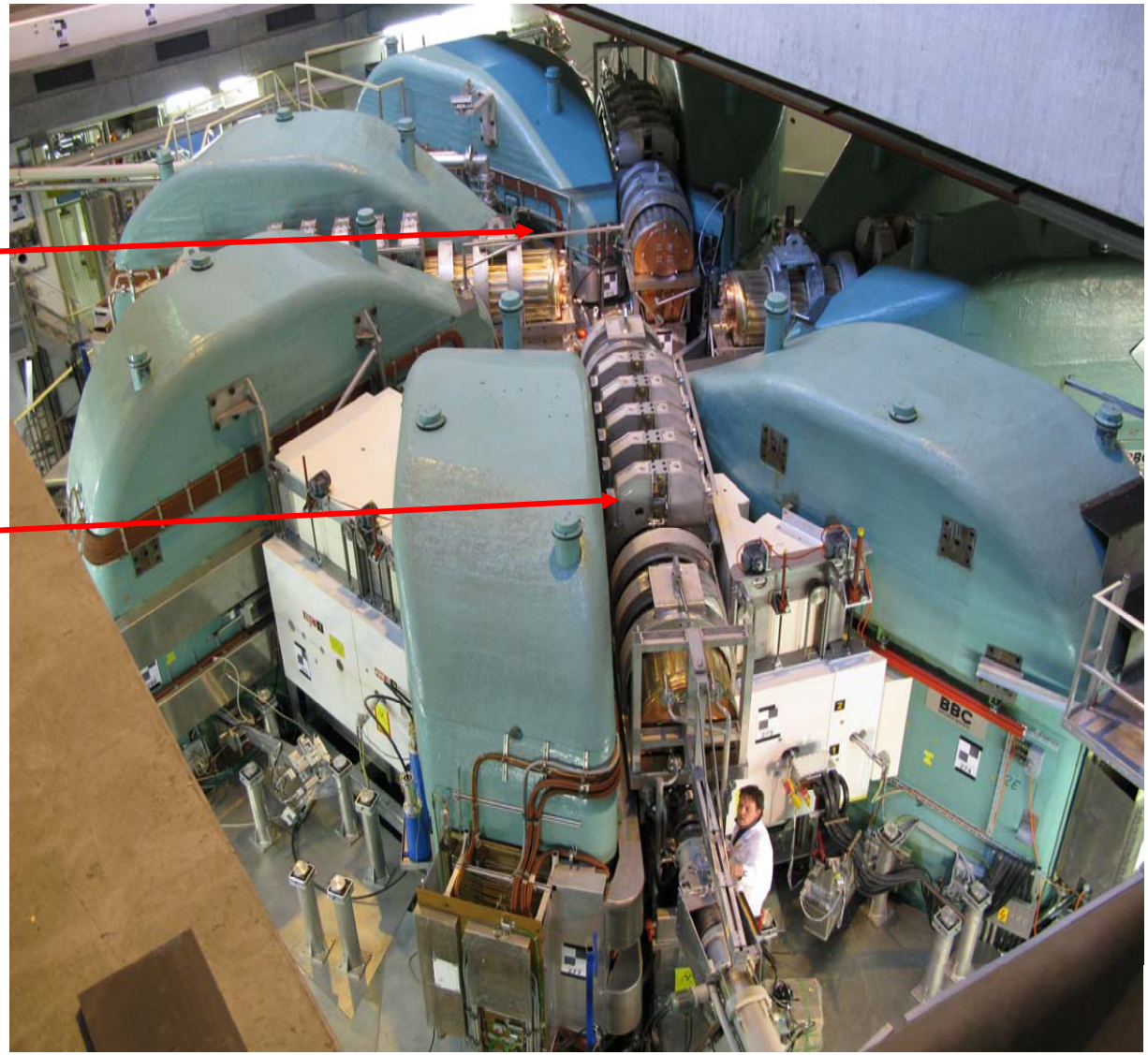
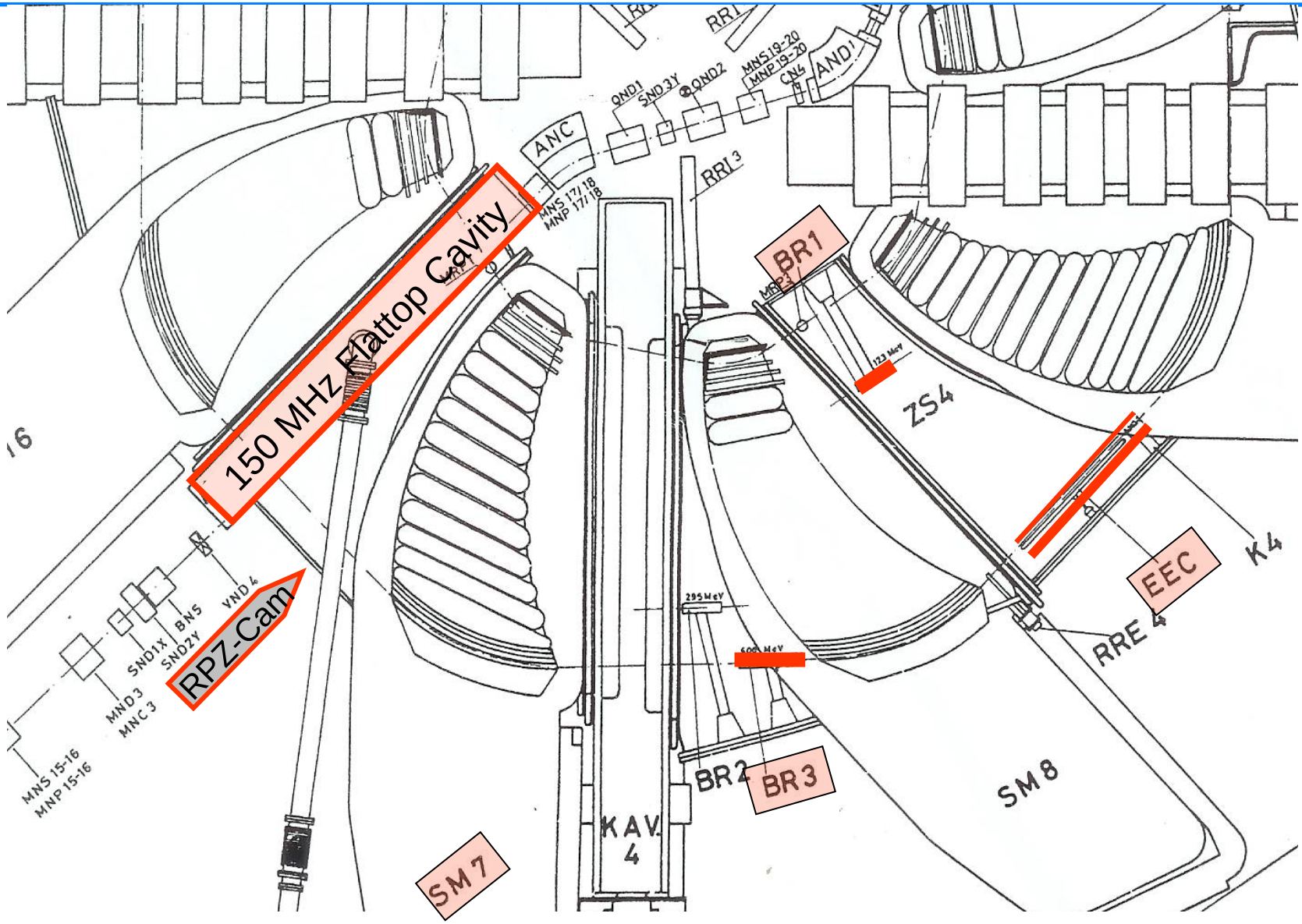


The PSI high Intensity Proton Ringcyclotron



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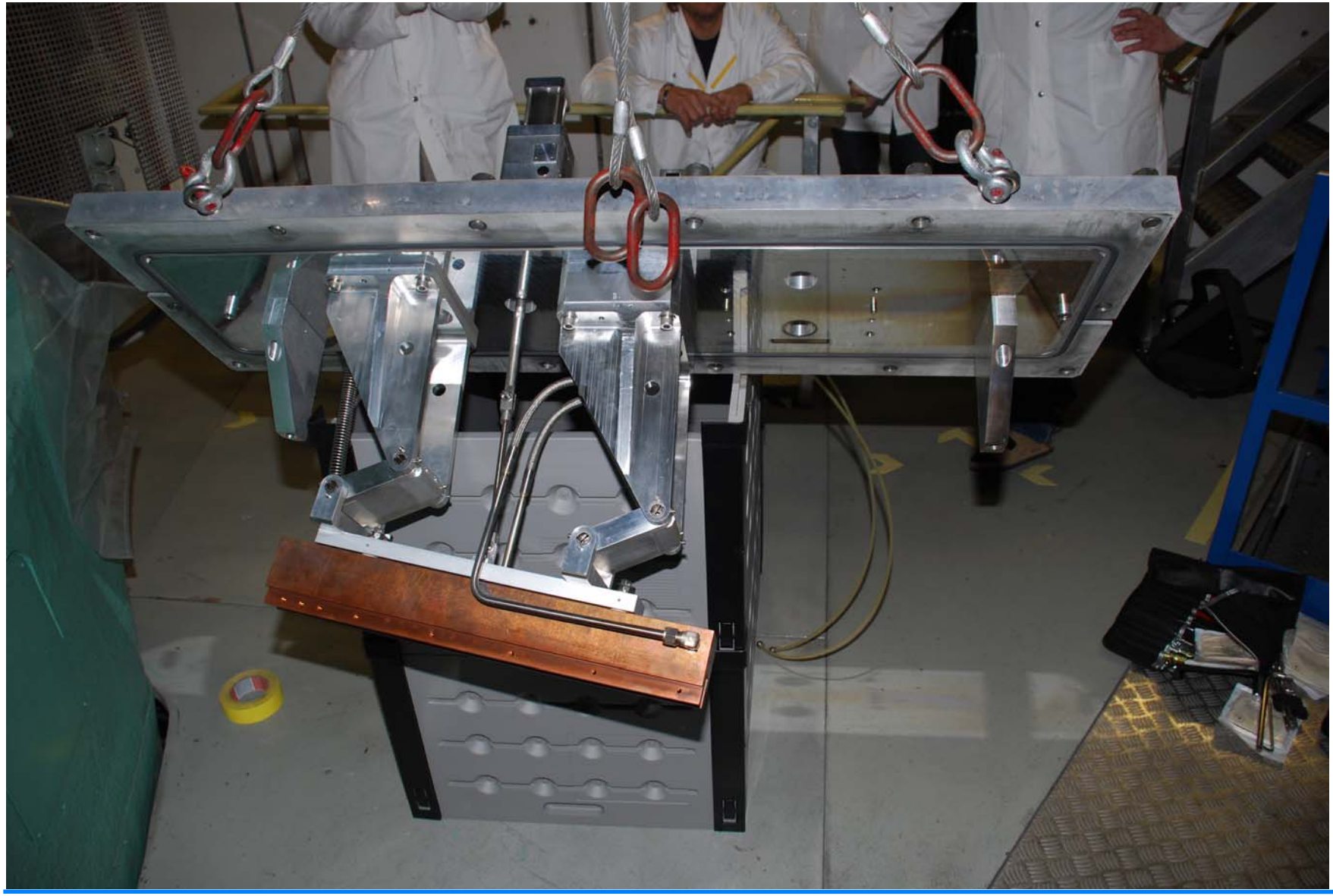
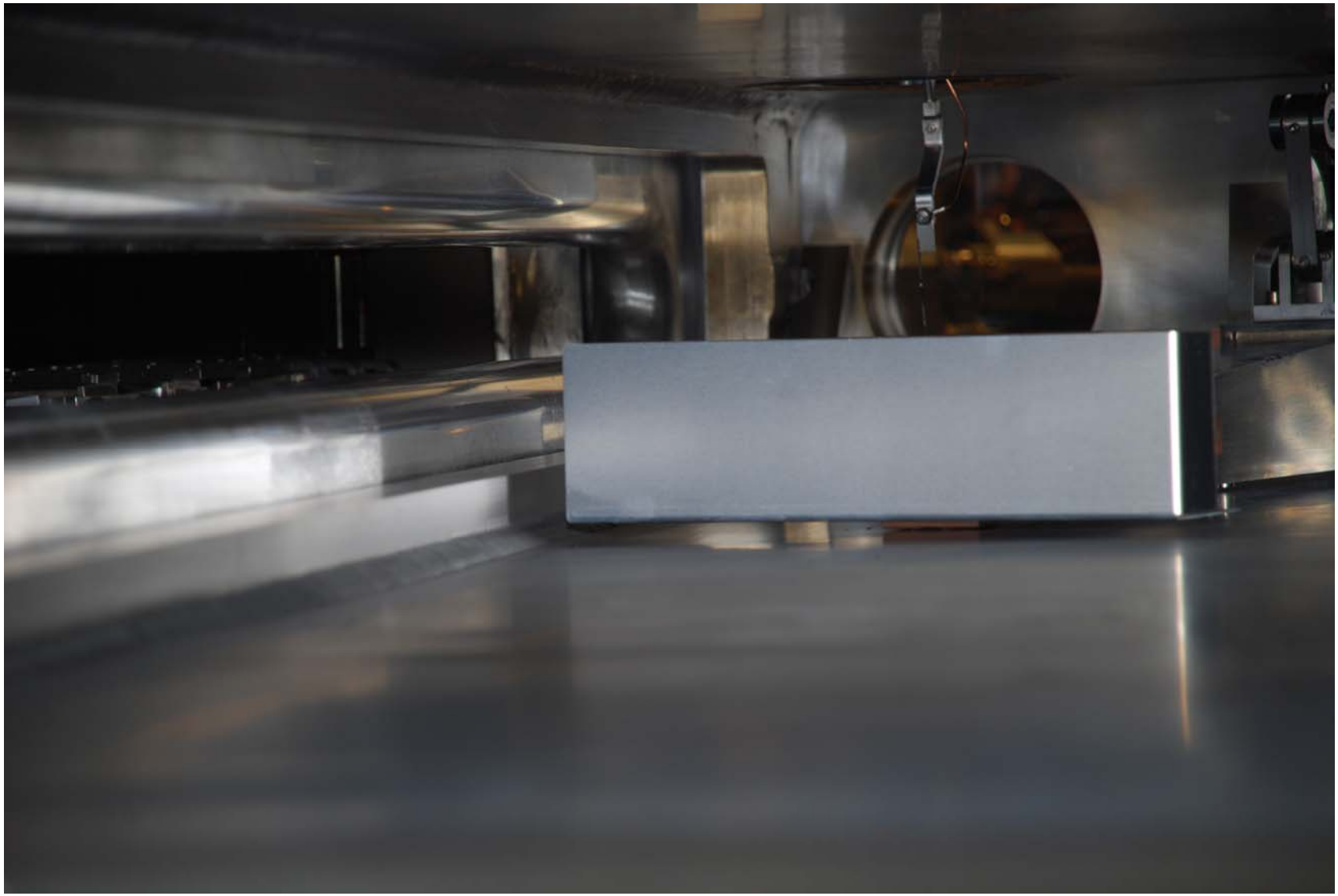
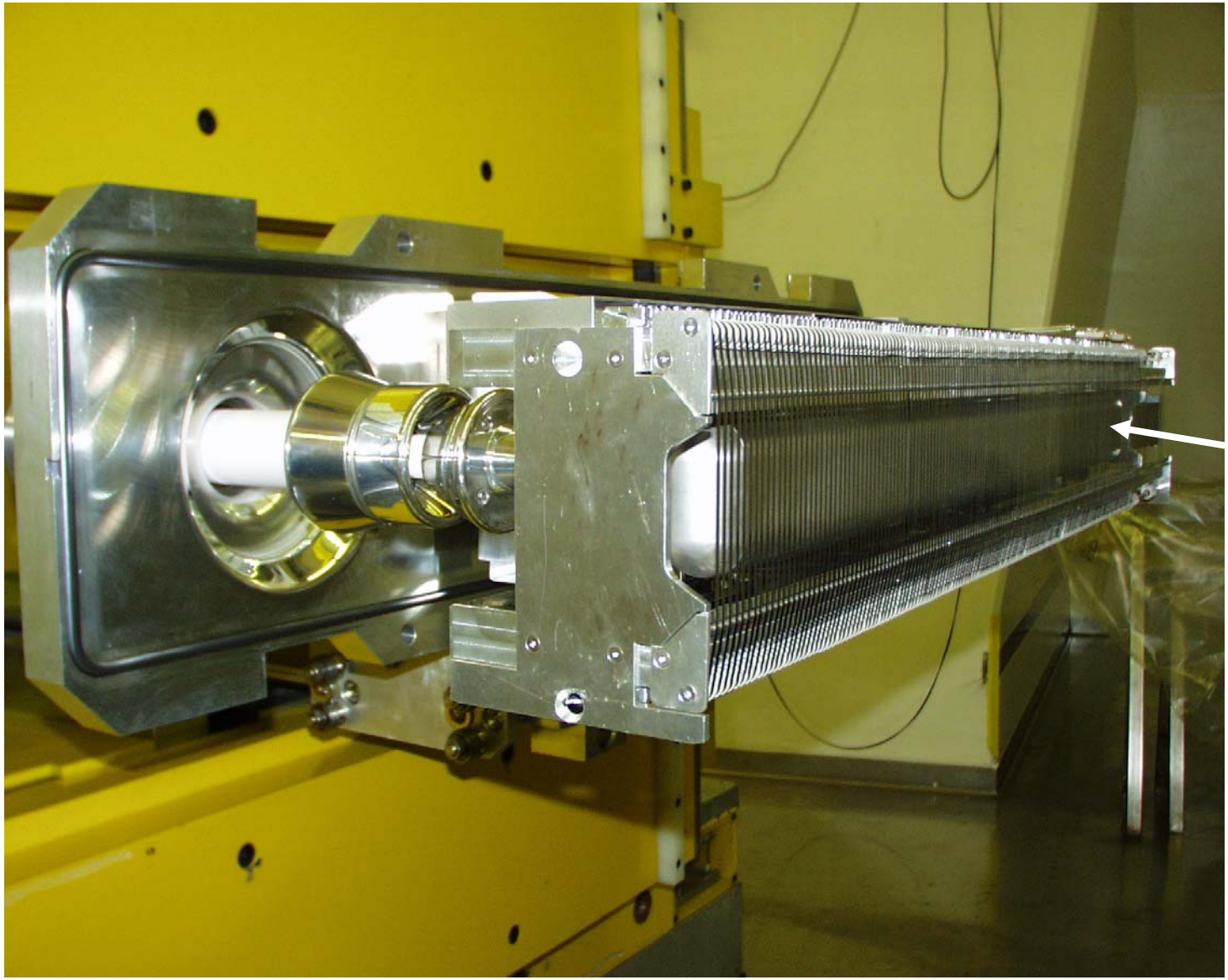
The Beam Stopper BR3



The Beam Stopper BR1



The Electrostatic Septum EEC

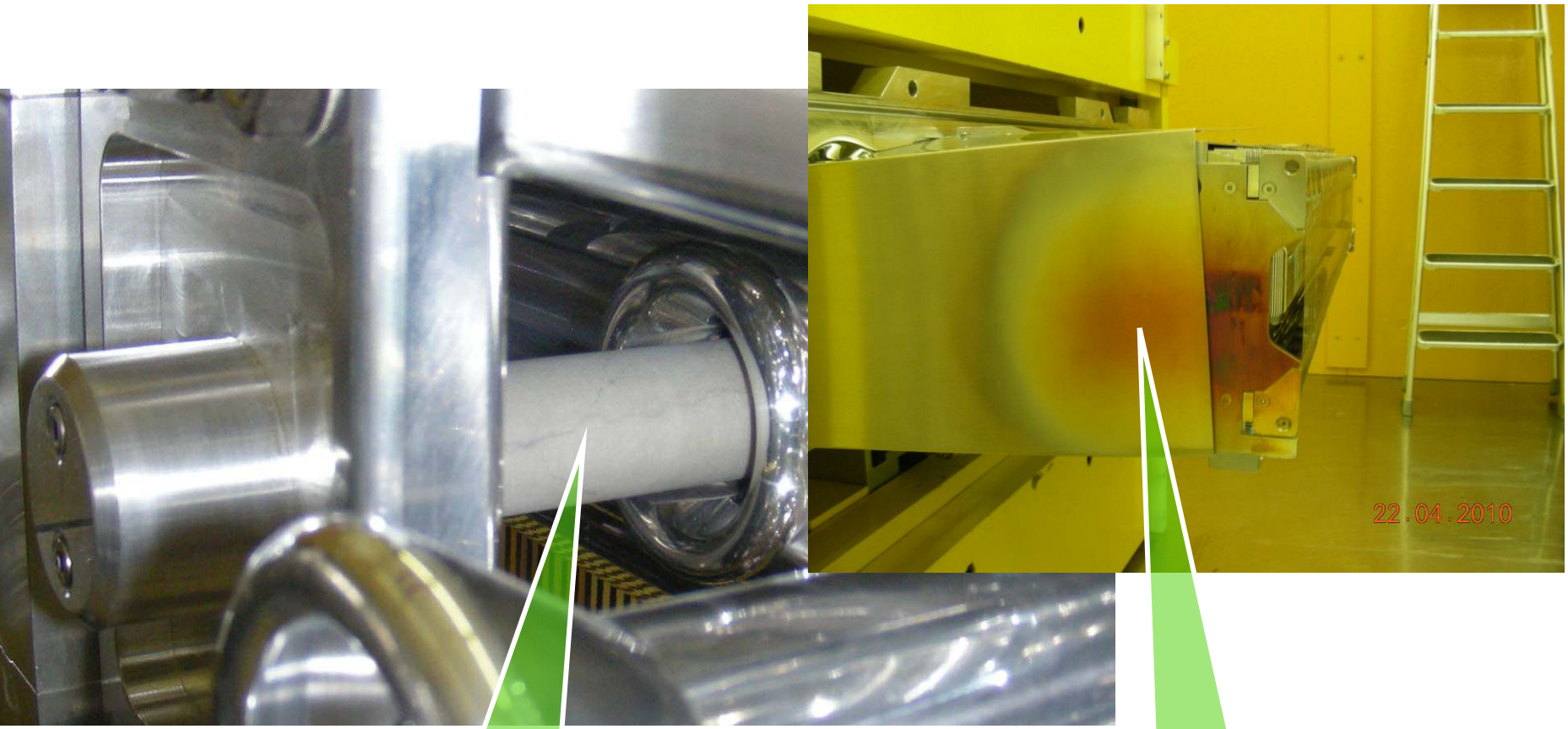


L = 1m
U = 140kV
D = 40µm

Monitoring Strips
3rd = RF pickup

Ins: BeO, Al_2O_3
Cat: plat. Al
An: W-Strips

Traces of damaging effects at the EEC

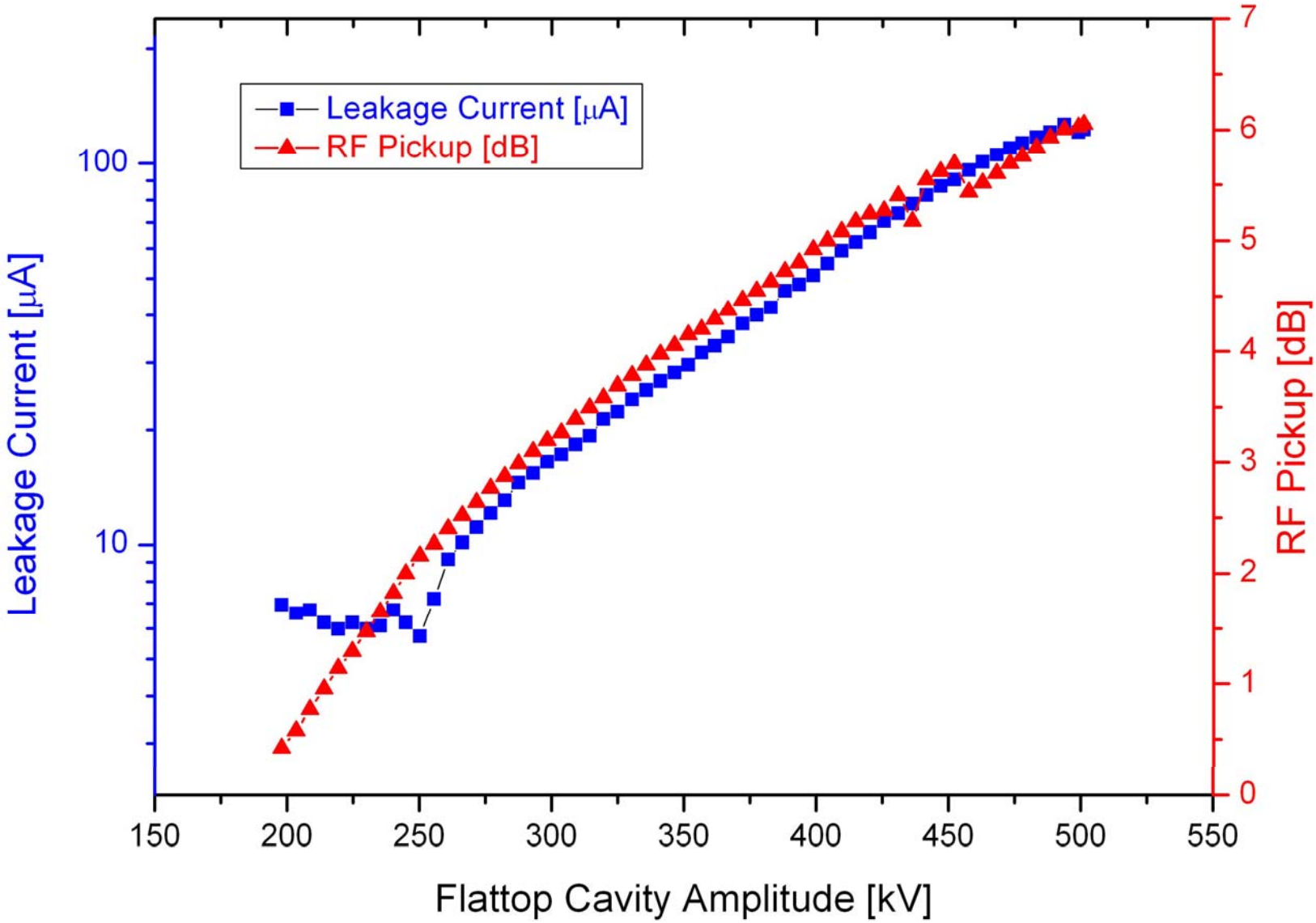


Electrically conductive Trace

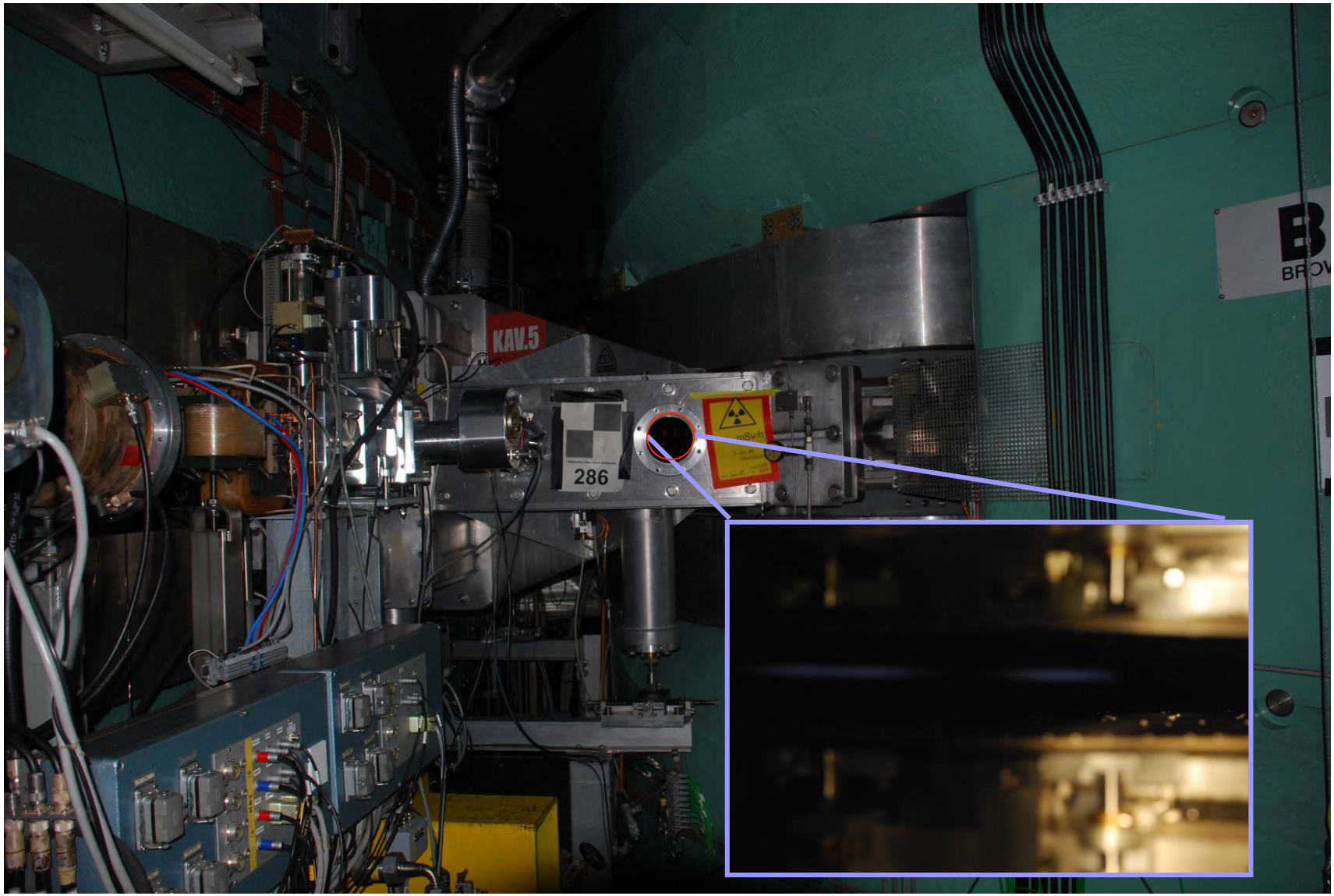
Metallic Layer

Courtesy R. Kan

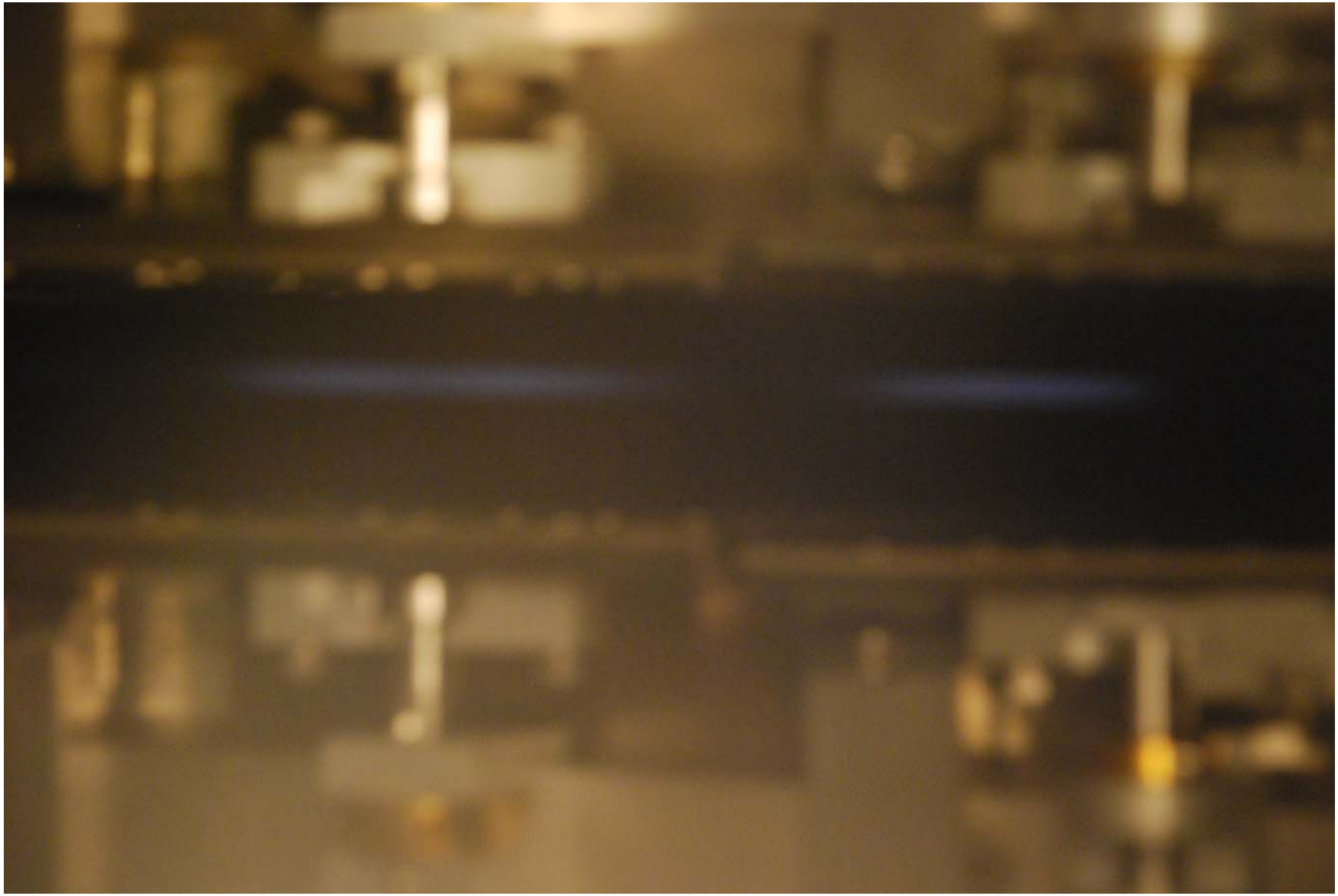
Leaking Current and RF Pickup vs. Amplitude



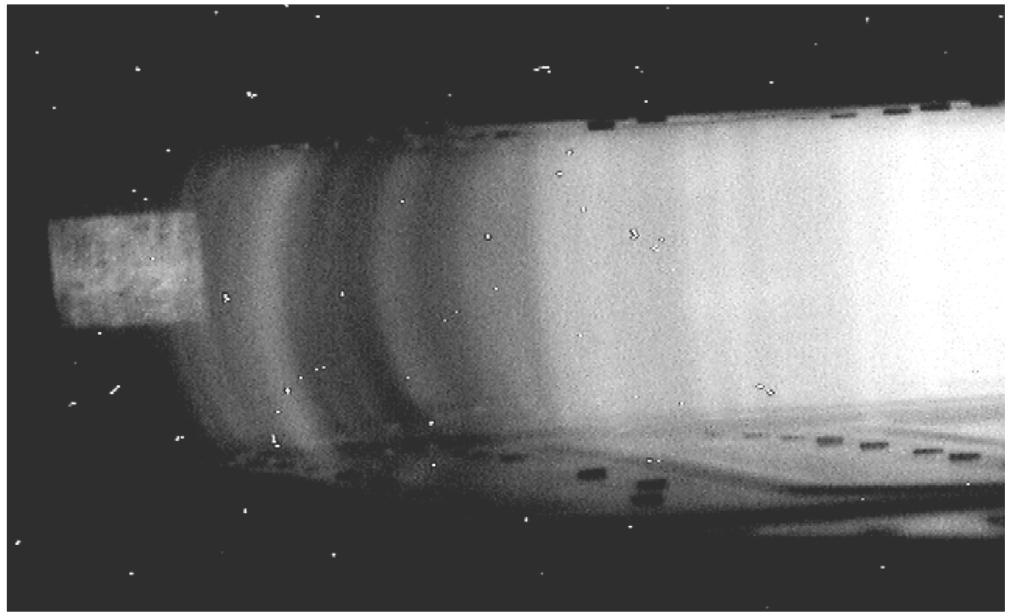
Window in the Intersection Region at SM7

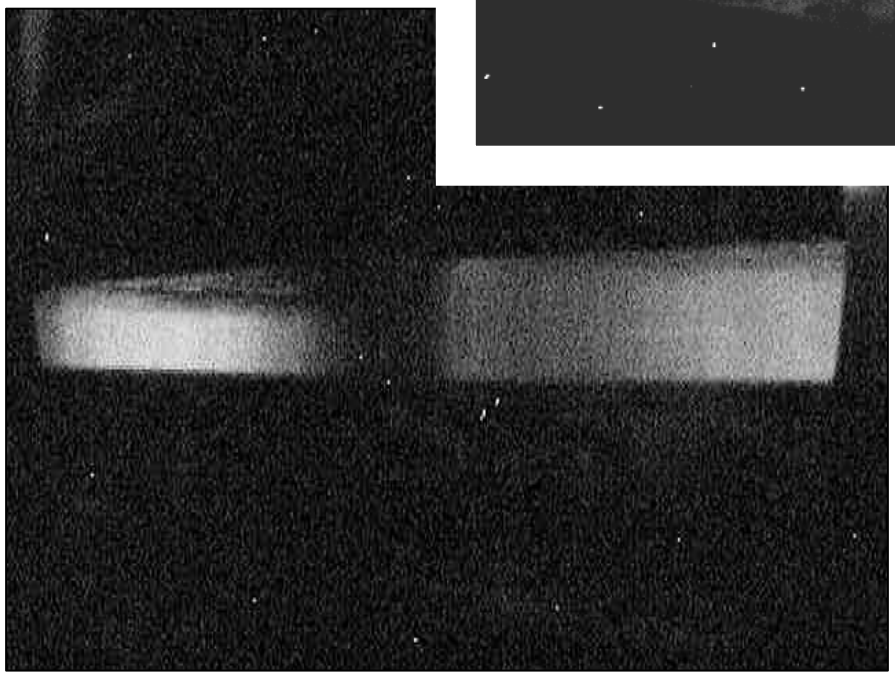


Glowing Phenomena at SM7

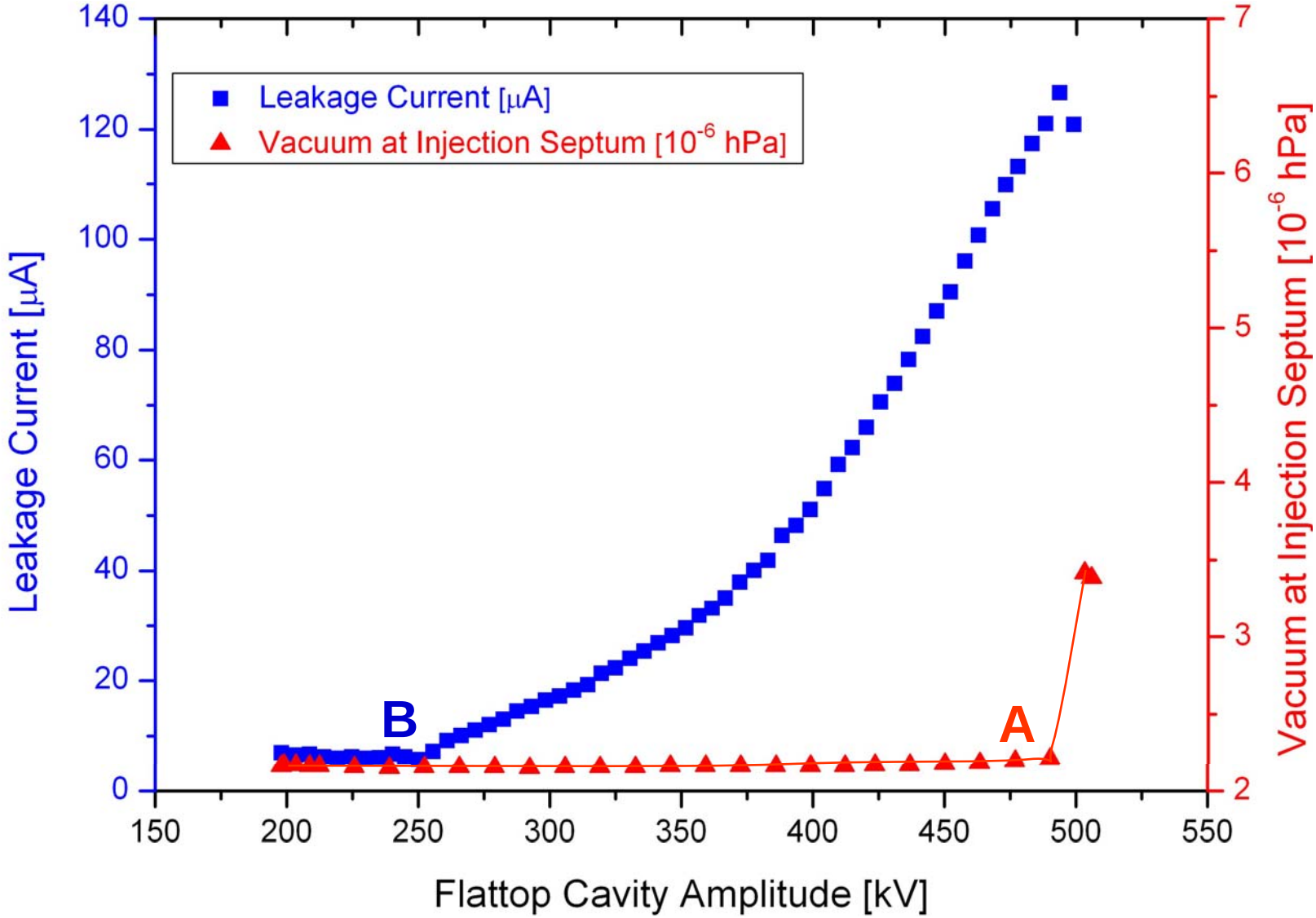


Glowing Phenomena at SM7

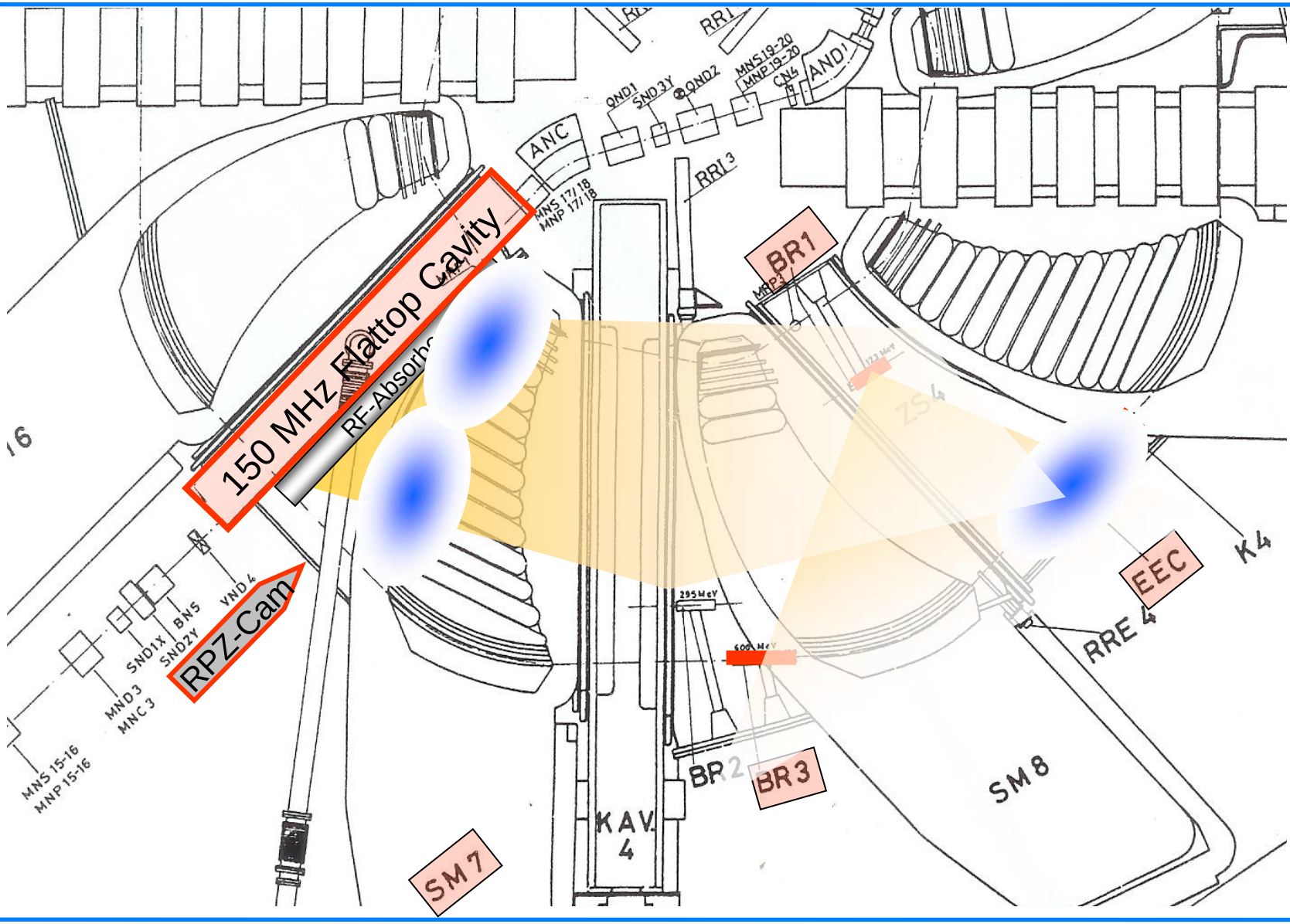




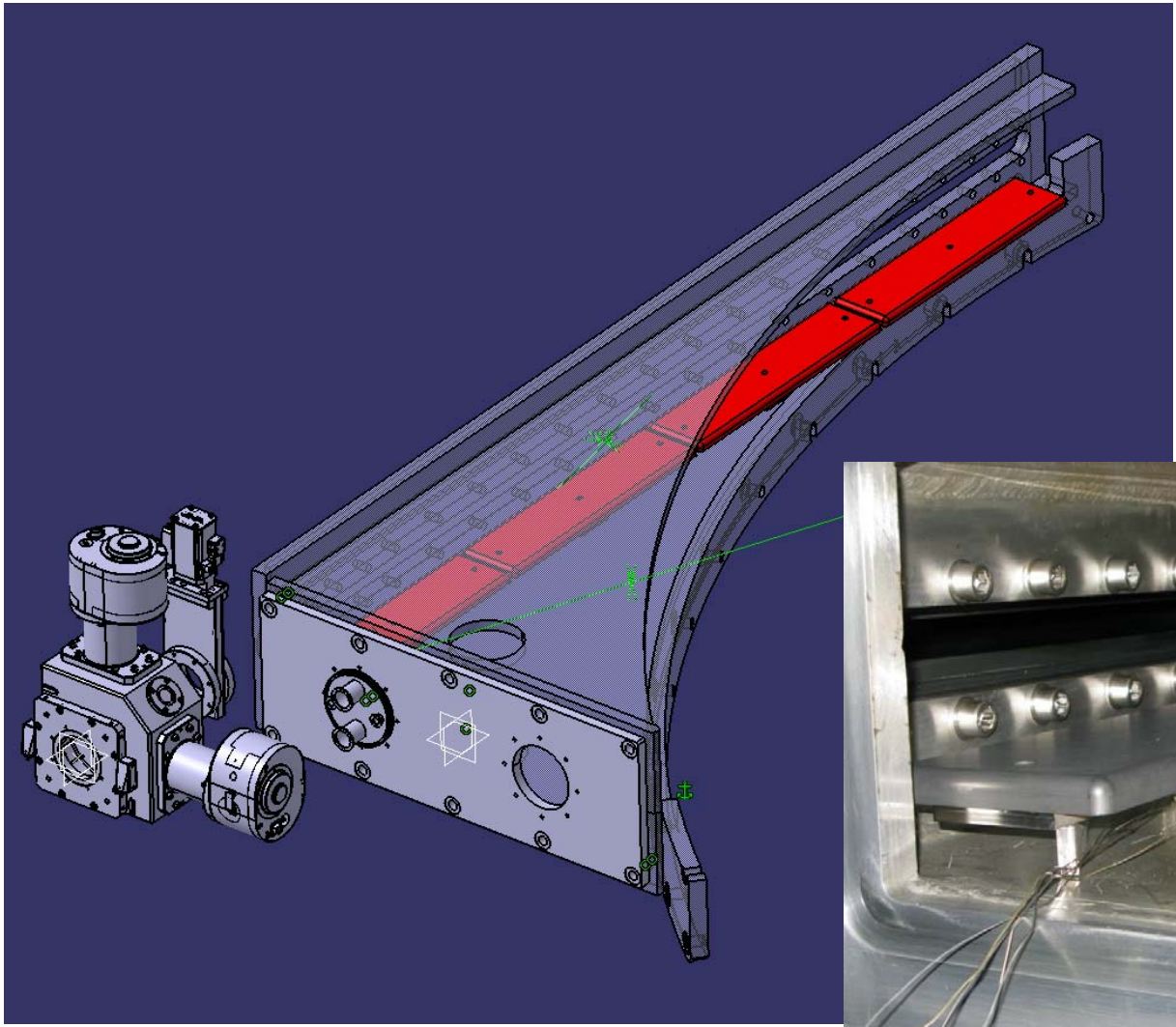
Residual Gas Pressure at Injection

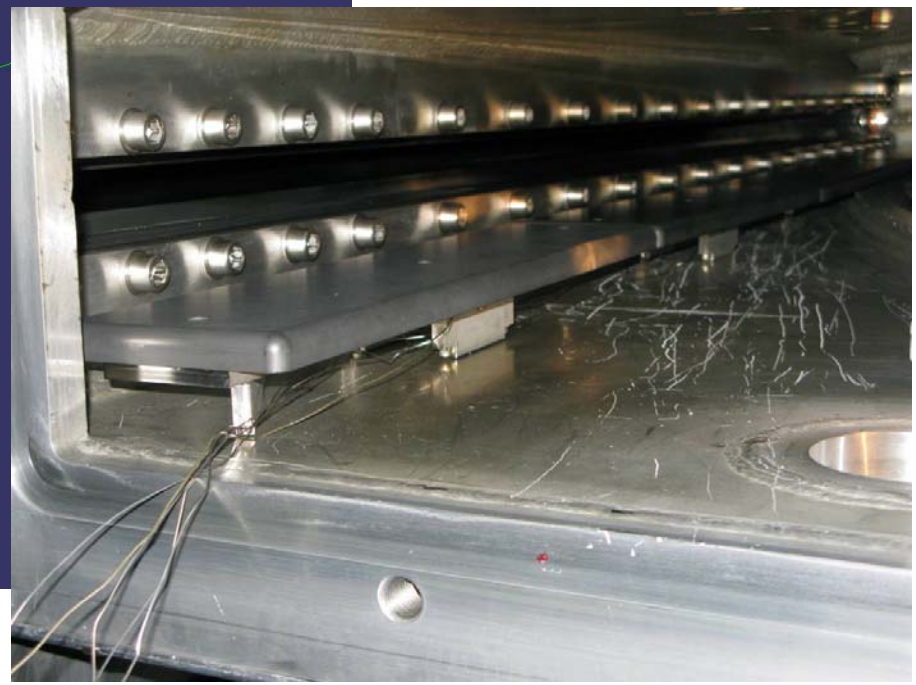


RF Phenomena in the PSI Ringcyclotron

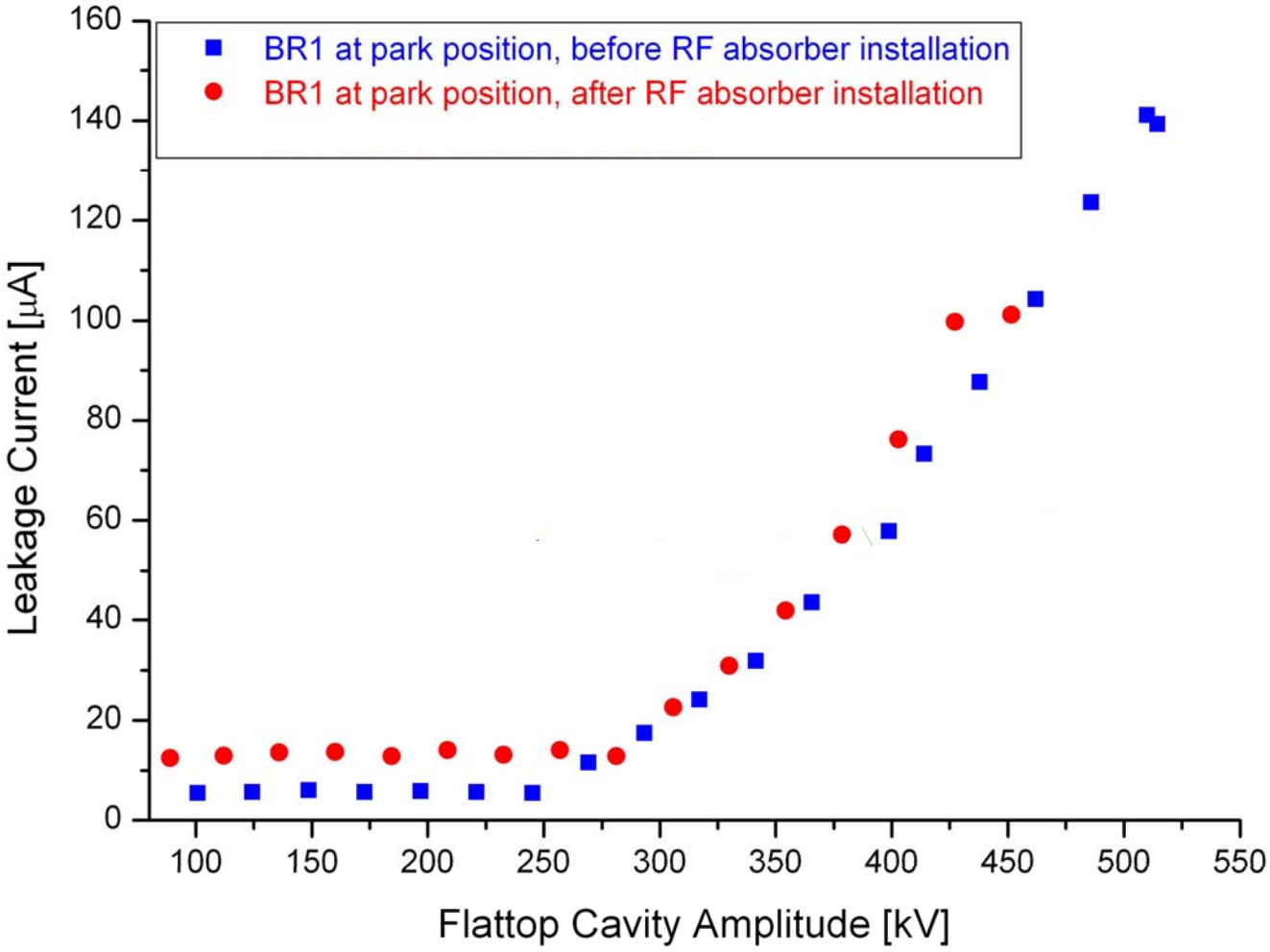


Tests with a Graphite RF Absorber

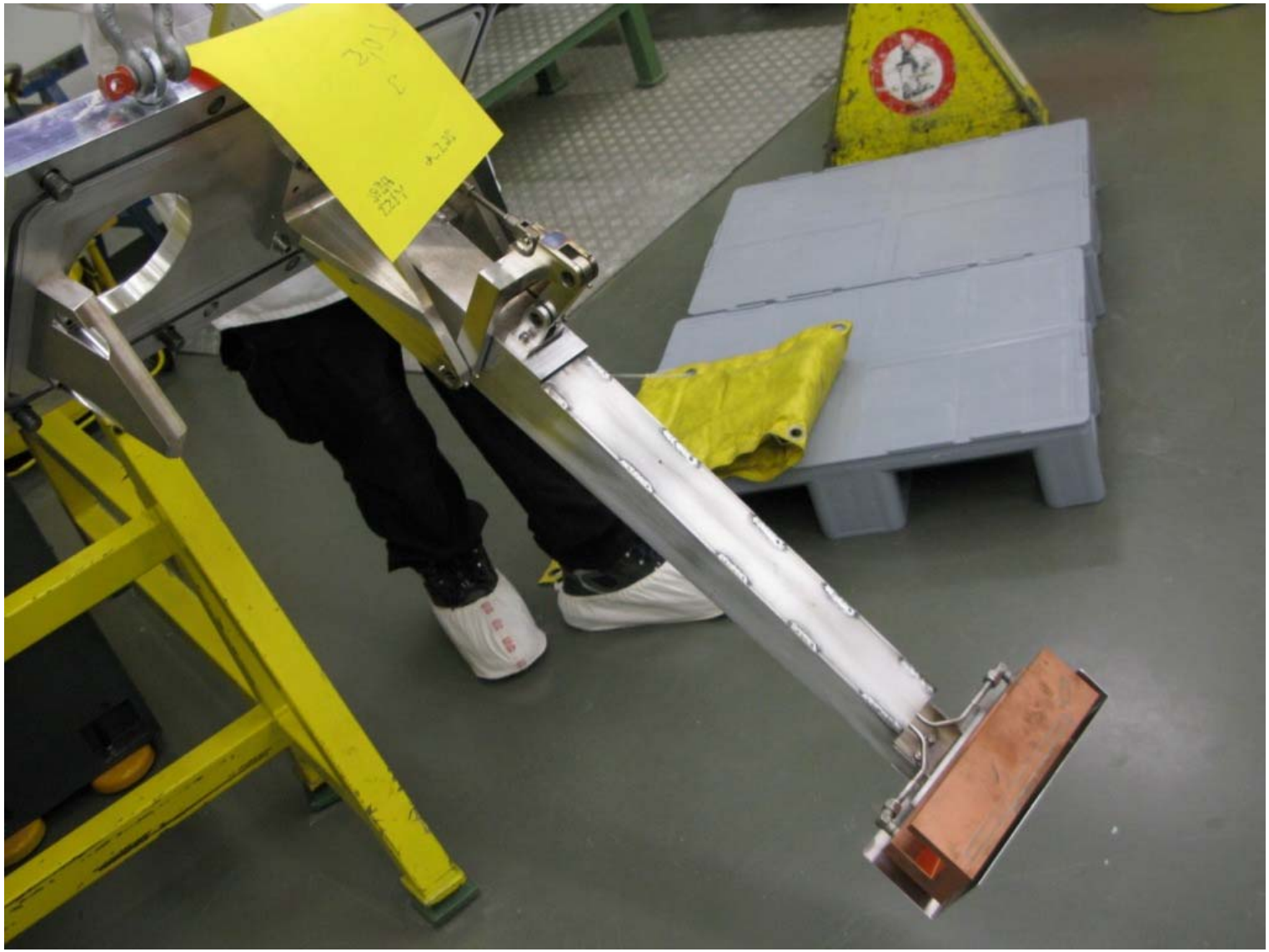




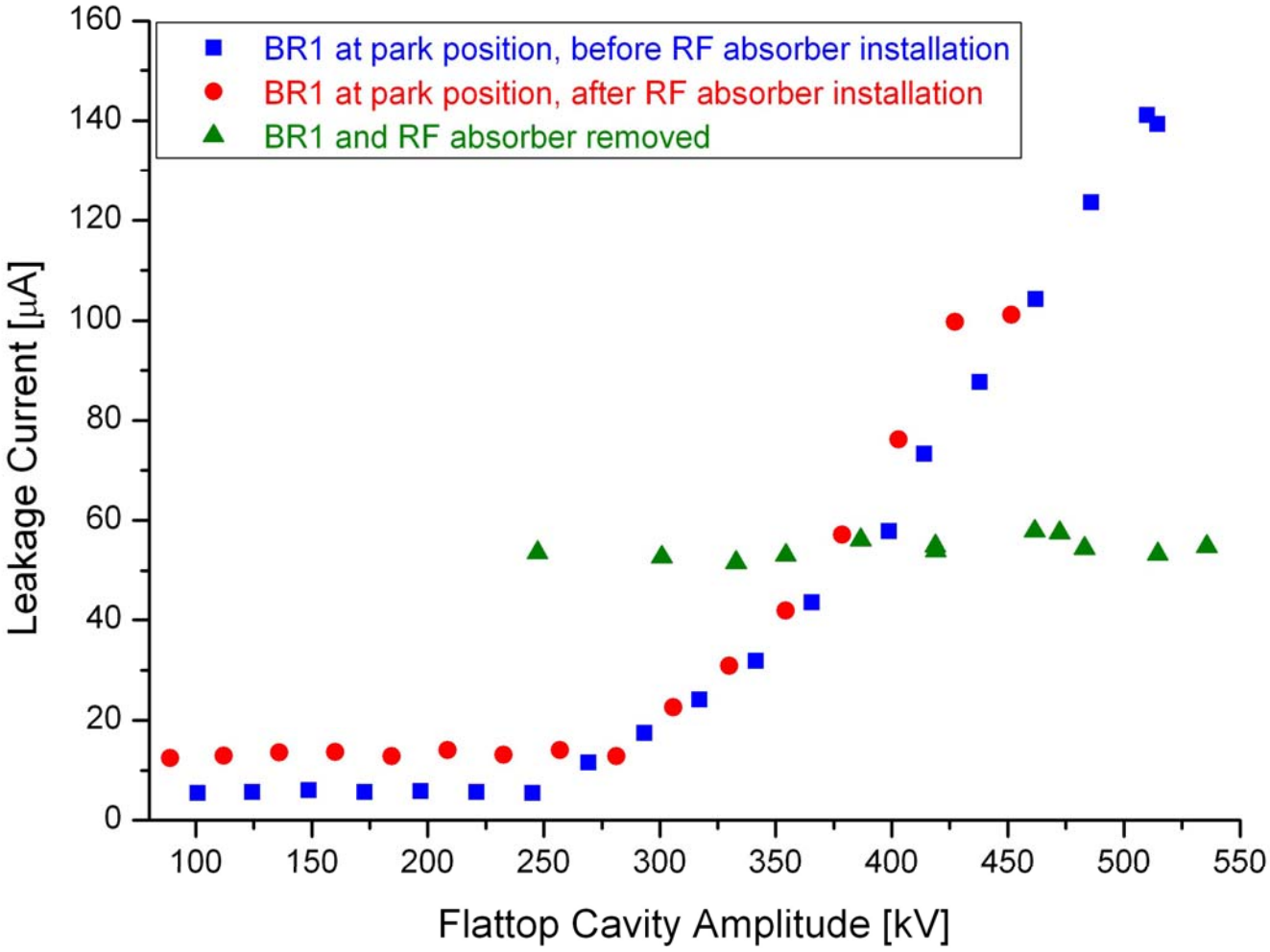
Leakage Current of EEC Septum



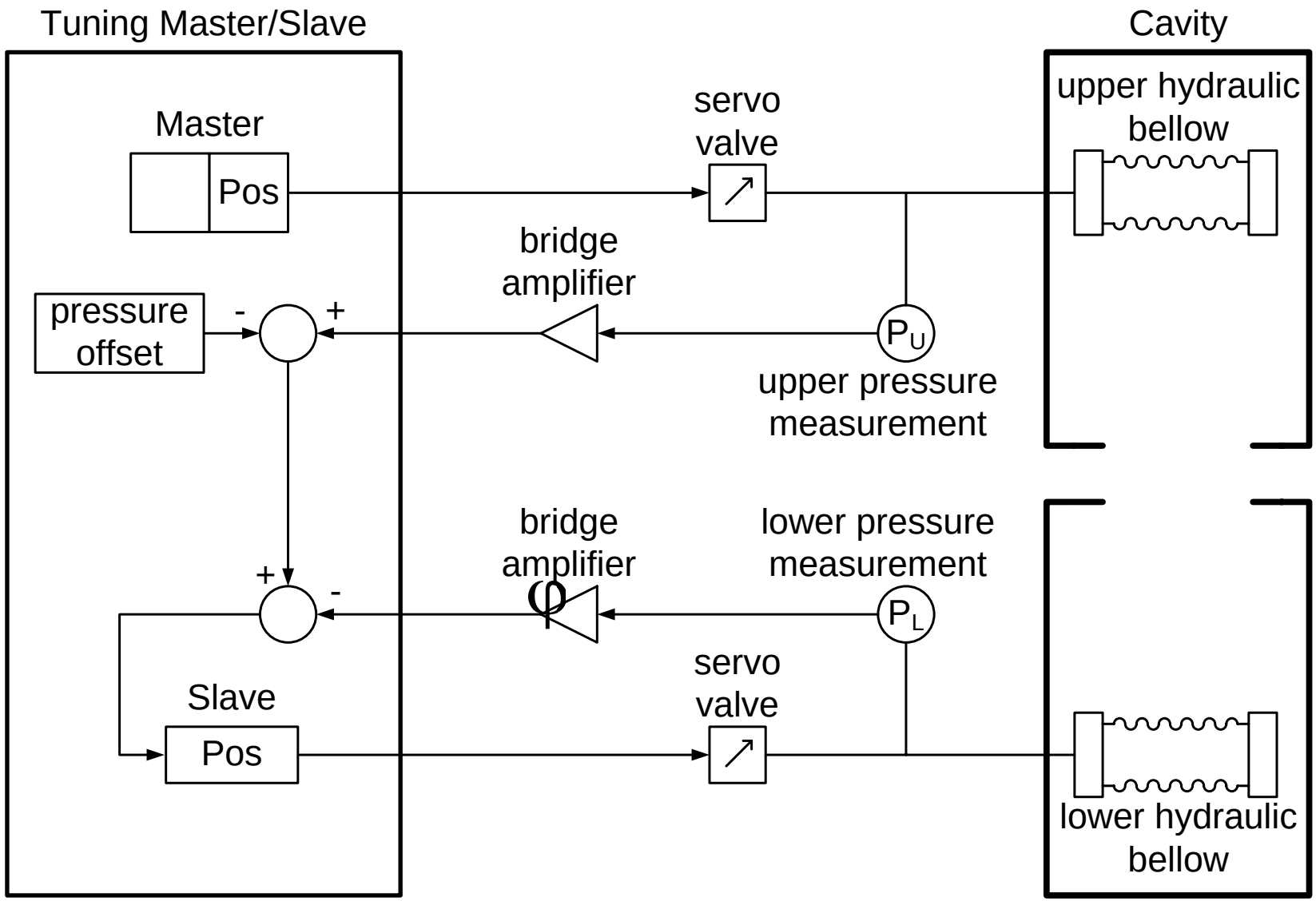
Withdrawal of The Beam Stopper BR1



Leakage Current of EEC Septum



Scheme of a Splitted Flattop Cavity Tuning System



Conclusions

An effective system to minimize the RF power decoupled from the cavities is mandatory to operate the Ringcyclotron reliably at beam currents up to 3mA.

The PSI approach will be an separate tuning system for the upper and the lower part of the cavity box.

Thank you for your Attention!