

# Highlights from IBIC'19 in Malmö

Georgi Georgiev & Raffael Niemczyk, Zeuthen, September 26<sup>th</sup> 2019

# Malmö, Sweden

South of Sweden, 3<sup>rd</sup> largest city in Sweden, population ~ 317 000

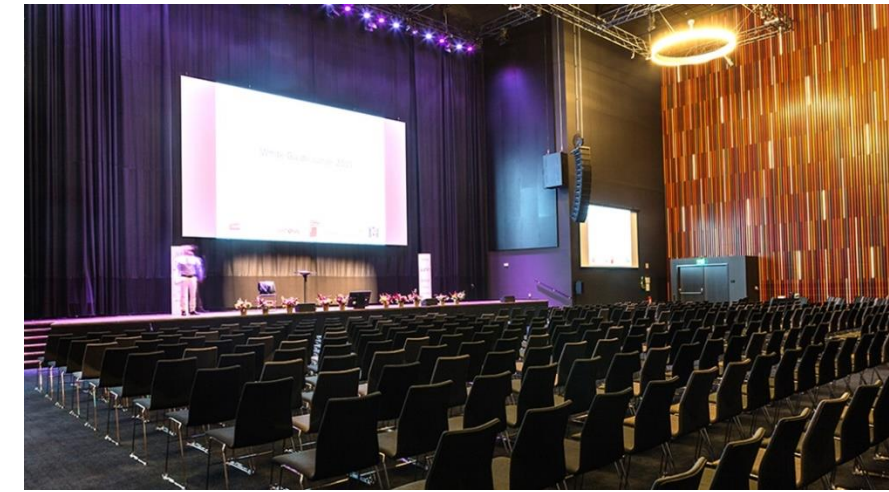
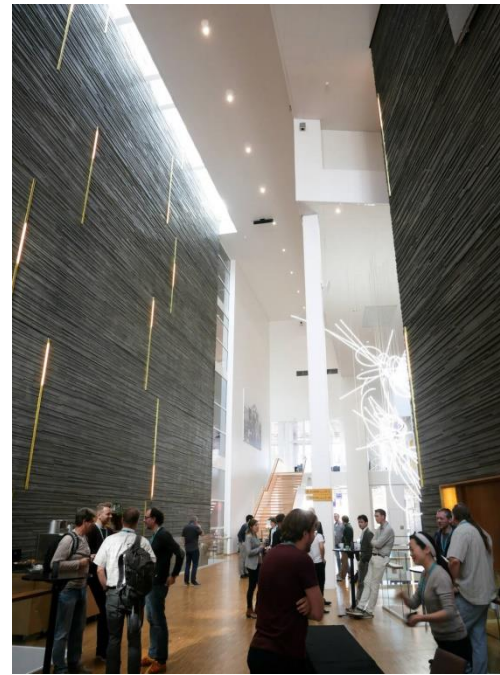




# Highlights from IBIC

## General things about the Conference

- No parallel sessions, 4 days, ~ 300 attendees
- Conference venue was nice
- Visit of Max IV & ESS construction side



## Overview of Beam Instrumentation at RHIC

- Electron cooling for stored ions in ring
- High demands for low energy spread etc.
- Special care to couple laser out (!)

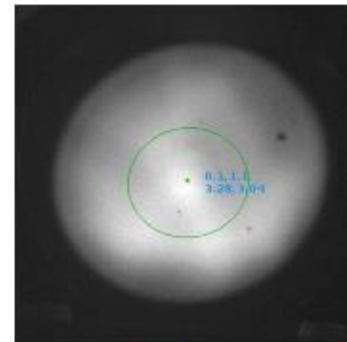
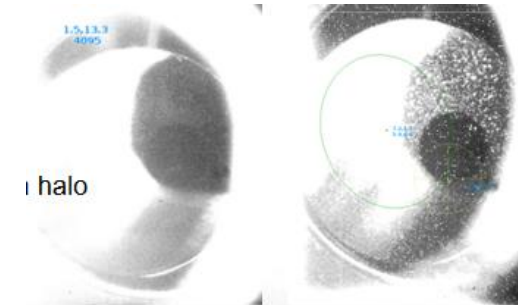
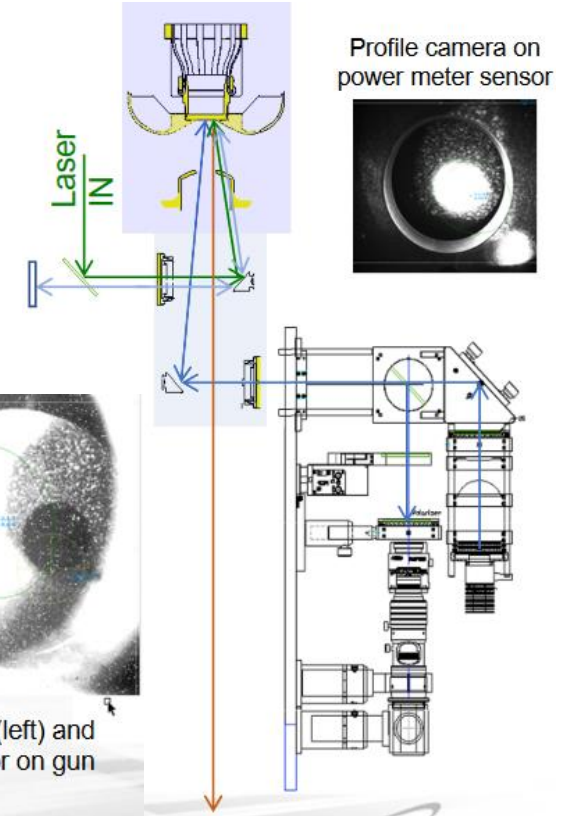


Image of QE map on profile monitor with LED illumination



Cathode active area before (left) and after (right) installing reflector on gun table.



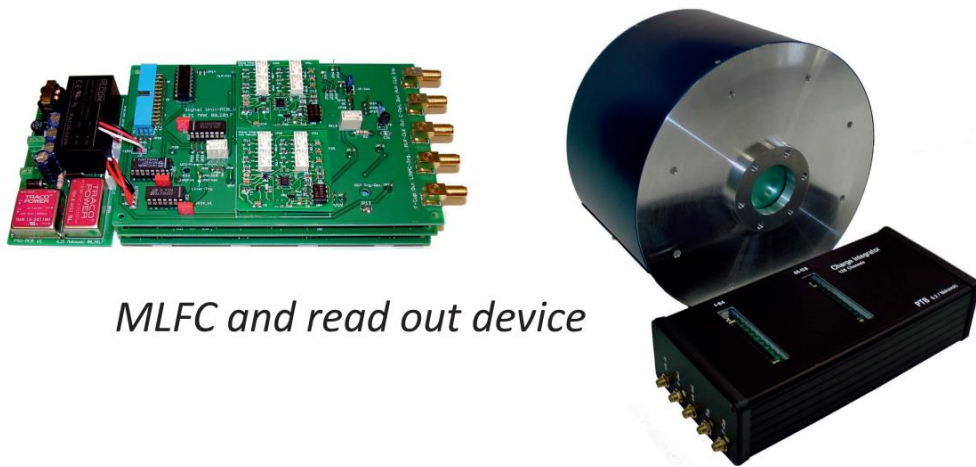
# Beam Energy Measurement with Faraday Cup

*A Multi-Leaf Faraday Cup for the determination of the beam energy of a 50 MeV electron LINAC in real time*

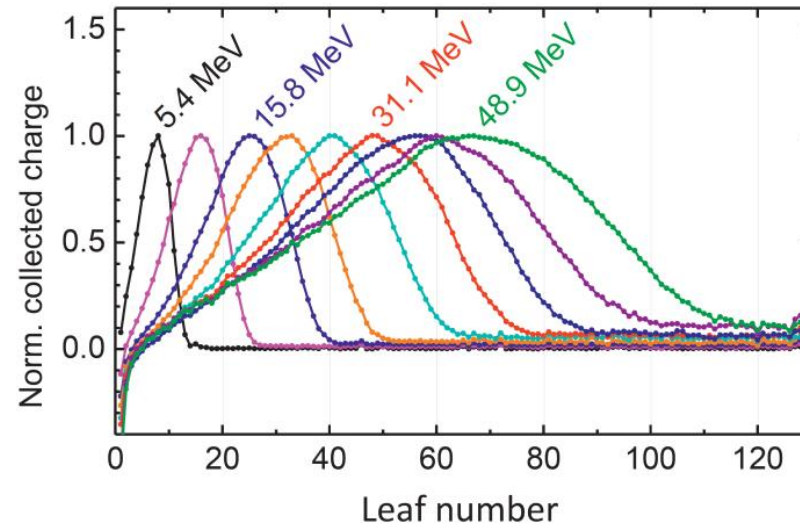
C. Makowski, A. Schüller

## Specifications

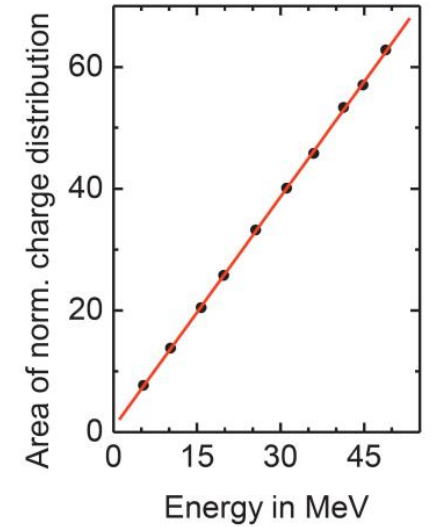
- 128 leafs (15x15cm) a 35  $\mu\text{m}$  Cu, 125  $\mu\text{m}$  glass fiber, 0.625 mm Al, 75  $\mu\text{m}$  polyamide
- Dimensions:  $\varnothing 22 \times 14$  cm / 5 kg
- Sampling rate: 10 Hz / 100 ms
- Pulse charge range:  $\sim 1$  nC to  $\sim 10$   $\mu\text{C}$
- Patent Pending PCT/EP2019/065254



*MLFC and read out device*



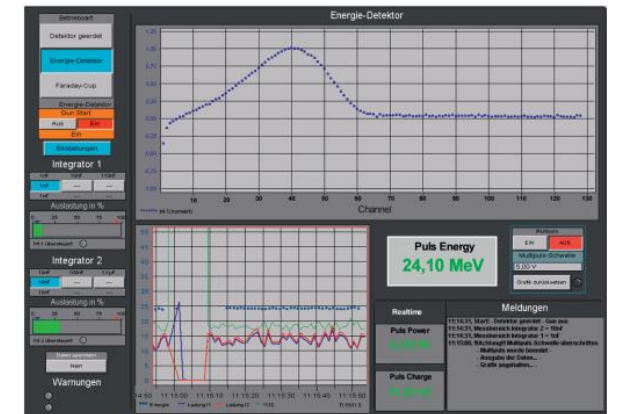
*Electron distributions from MLFC*



*Calibration curve*



*MLFC mounted at LINAC*



*Real-time display*



# Pepper Pot Experiment in Details

DEVELOPMENT OF A PRECISION PEPPER-POT  
EMITTANCE METER  
G. Hahn, J.G. Hwang

Precise aperture drilling - optical lithography

Noise filtering and image alignment

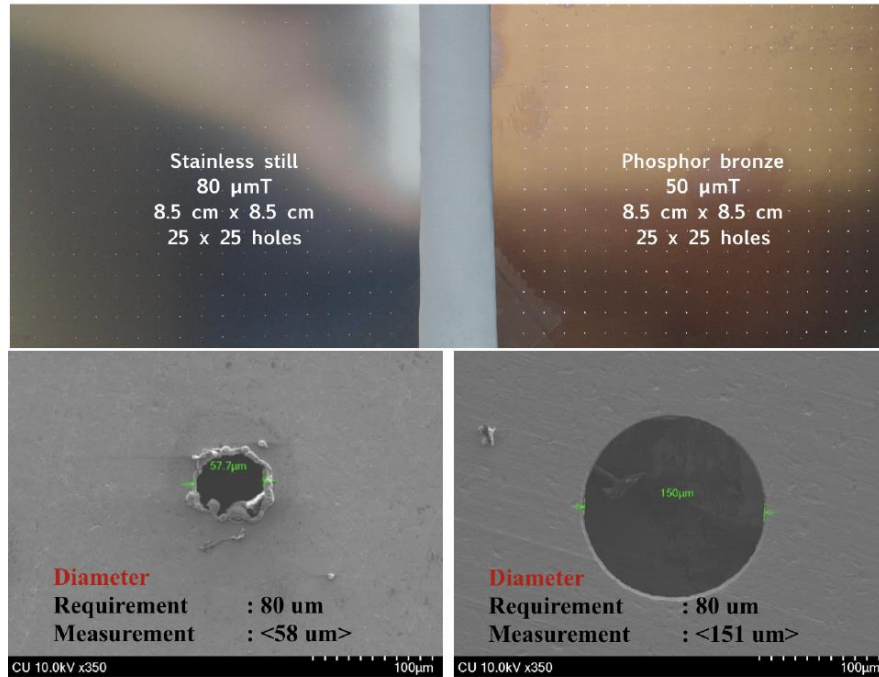


Figure 3: Picture of SEM measurement of two masks; SUS and phosphor bronze.

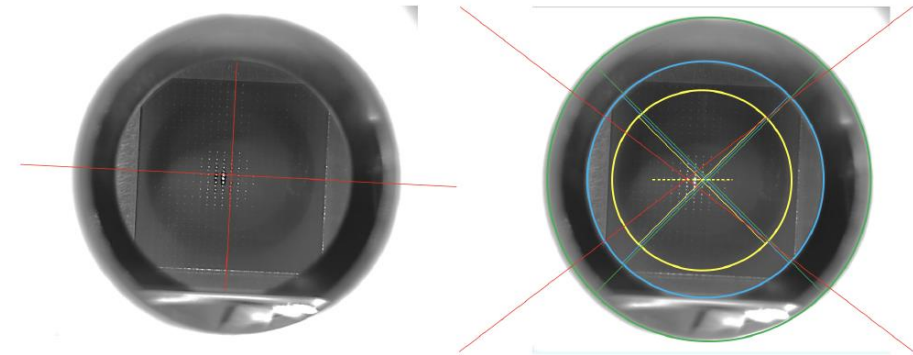


Figure 5: A sample image for the calibration; the left shows the camera rotation error and the right shows the geometrical tilting error due to the shifted view port location.

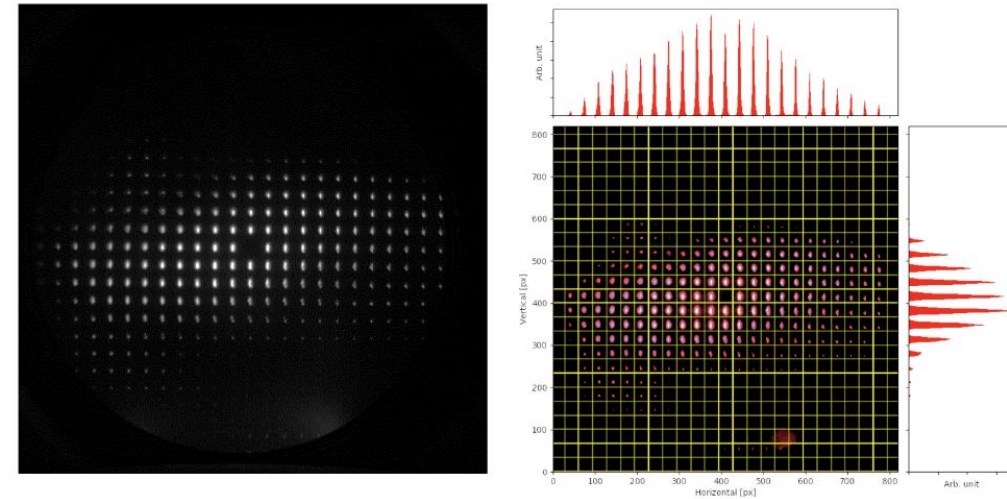
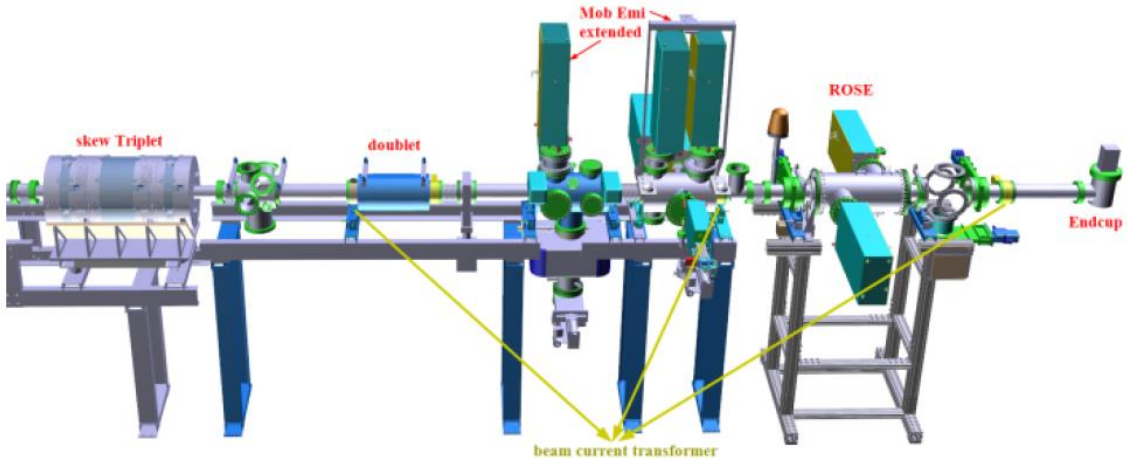
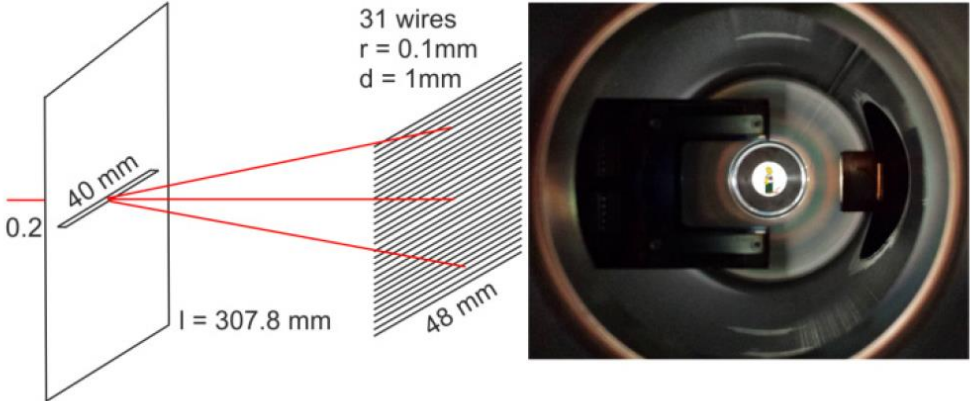


Figure 6: Raw image view(left) and a beam spot partitioning view (right).

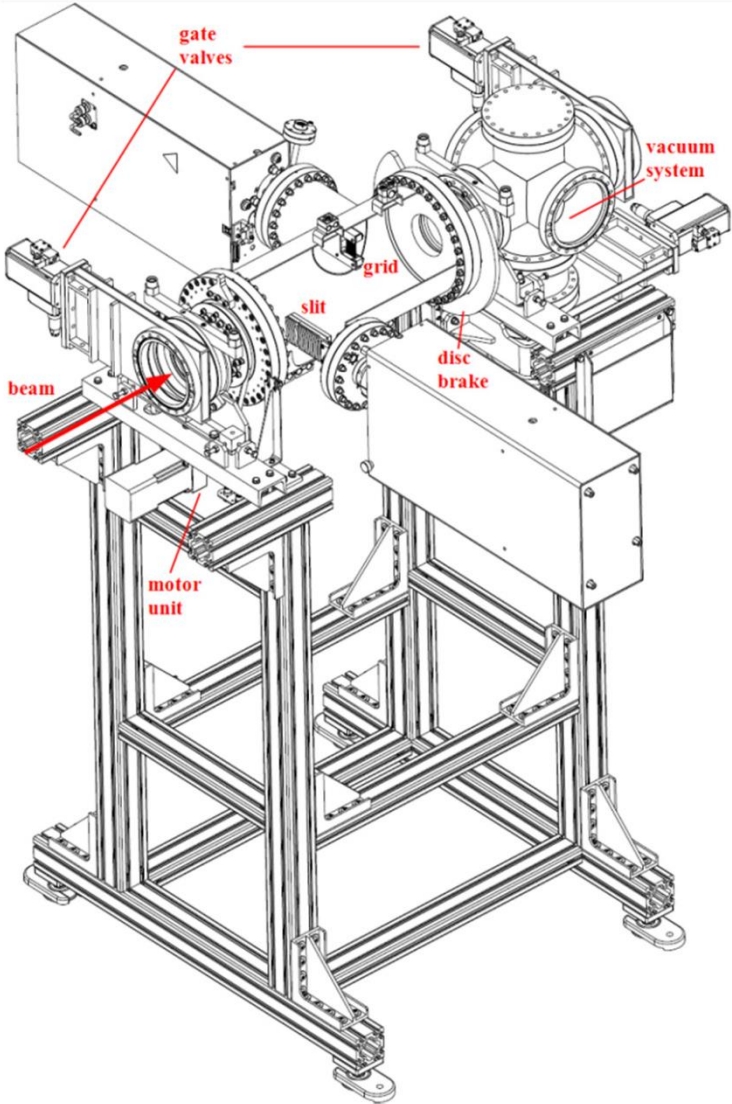
# Slit Scan for 4D Transverse Beam Matrix

*ROSE - A ROTATING 4D EMITTANCE SCANNER*  
 M.T. Maier, et.al.

Rotating slit station  
 About 5 t in weight  
 ~40 min for 4D measurement  
 For heavy ions



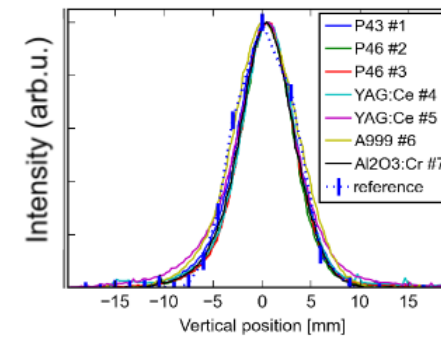
## DETECTOR SYSTEM ROSE



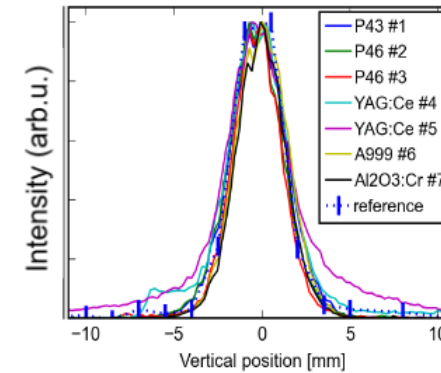
# Highlights from IBIC

## Seminar: Screen materials for High-Precision Measurements

- Overview of scintillation mechanism
- Also mentioning imaging optics and cameras
- Summary of results from different labs/scientists
  - Comparison of different materials: Some give very poor results (see right)

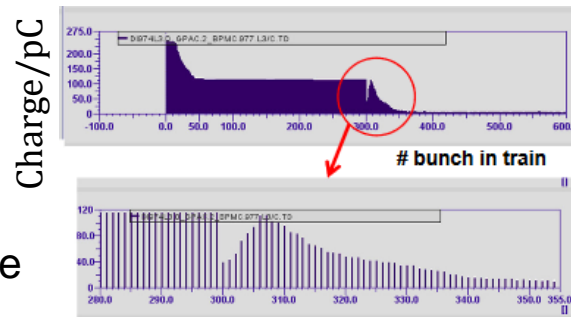


Top vs. bottom:  
Different ion species

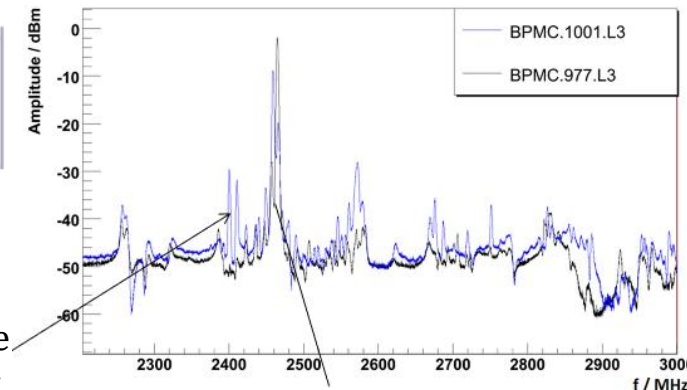


## Pile-Up Effect of Cold Button BPMs in the European XFEL Accelerator

- 'Ghost' bunches observed at XFEL
- Caused by ringing in/around BPM pickup antenna
- Problem solved by adding bandpass filters
- But: This worsened position resolution beyond design value



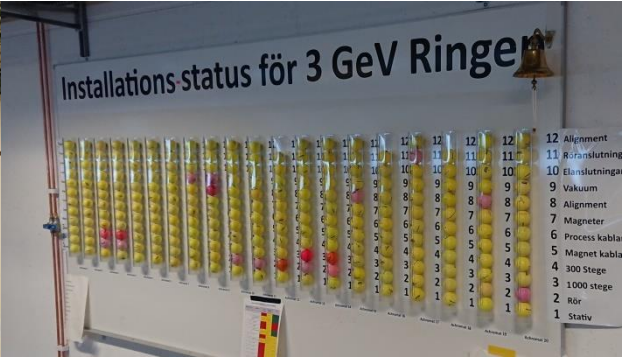
This resonance  
rings for long





# Highlights from IBIC

## Visit of Max IV and construction site of ESS



Both poster were well attended!

