IBIC2013

International Beam Instrumentation Conference

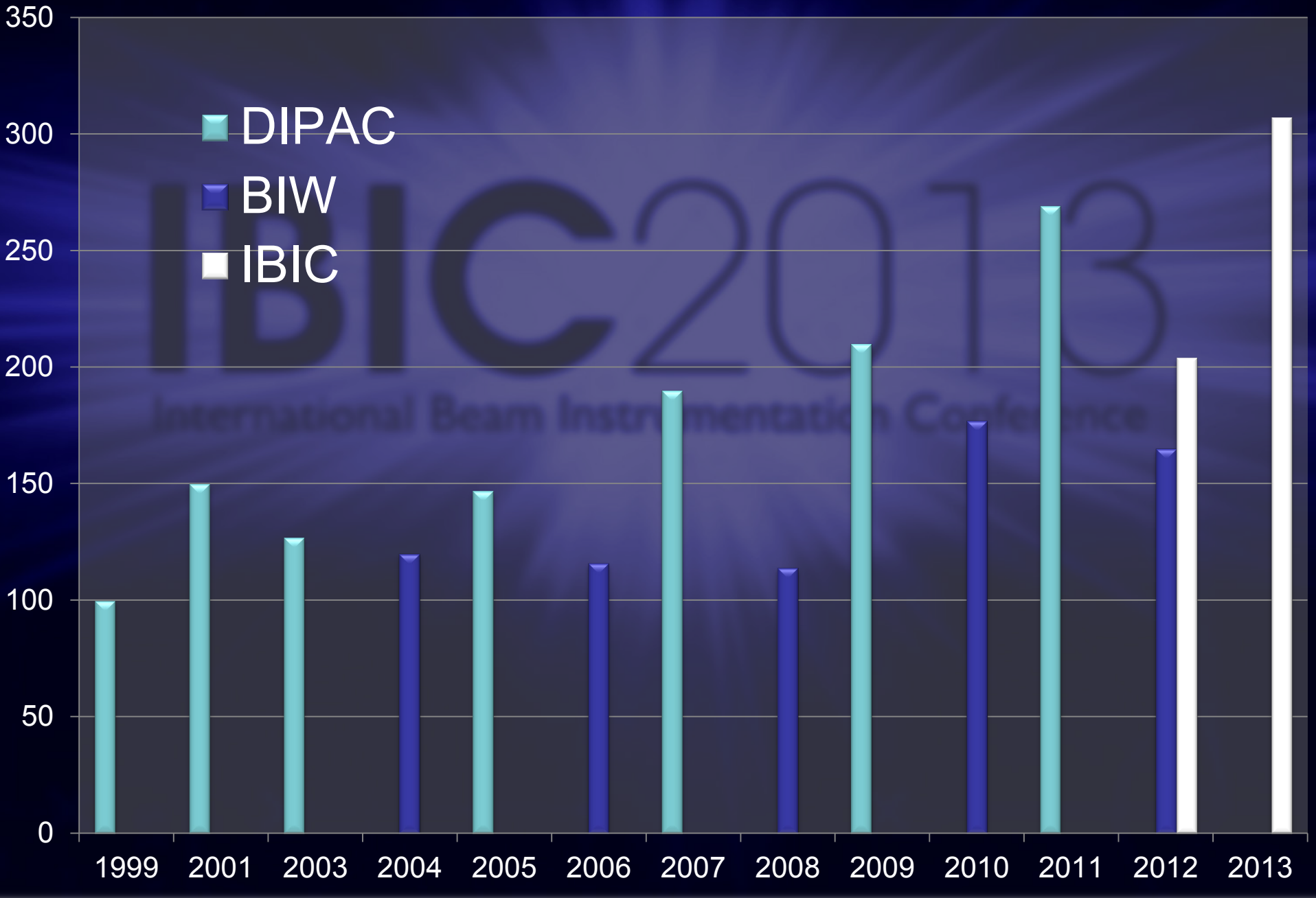
Highlights of IBIC2013

Guenther Rehm

Programme of IBIC2013

- At the SAÏD Business School in the centre of historic Oxford, from 16-19 Sept 2013
- 11 invited talks of 35+5 minutes
- 21 contributed talks of 15+5 minutes
- 1 public evening lecture of 60 minutes
- 3 poster sessions of 2.5 hours length each with a total of 240 posters presented

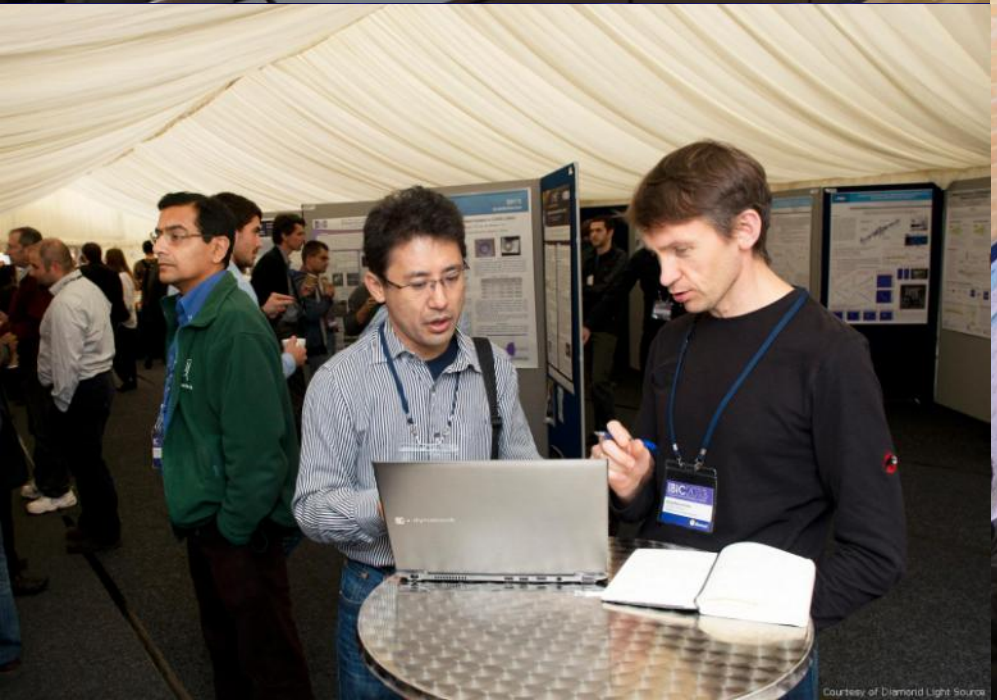
Delegates=Standard+Students+Exhibitors

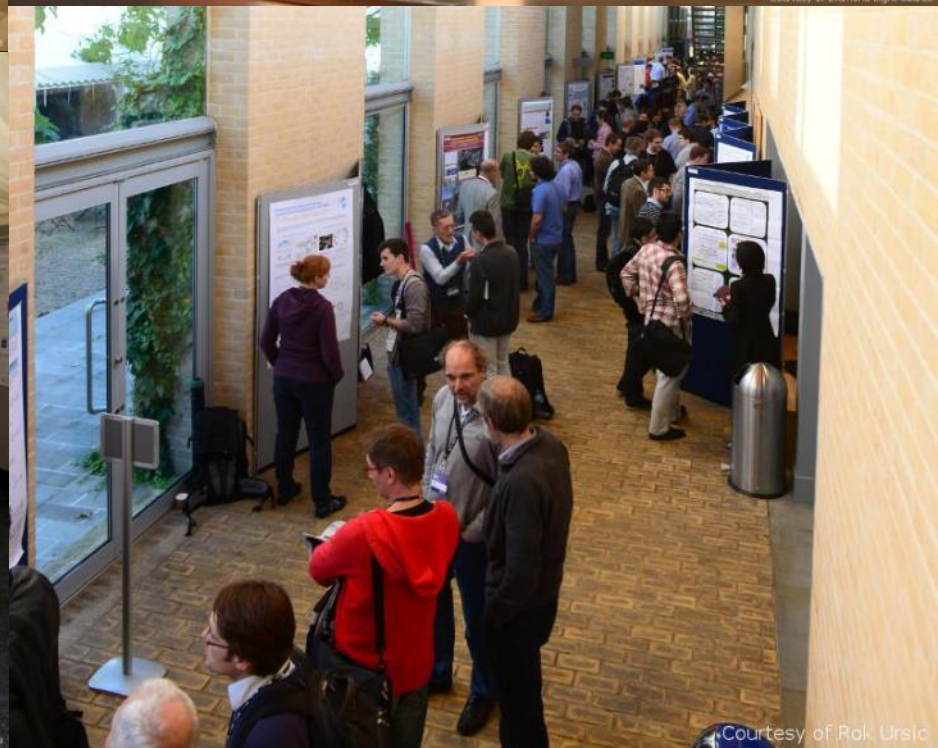



Courtesy of Diamond Light Source

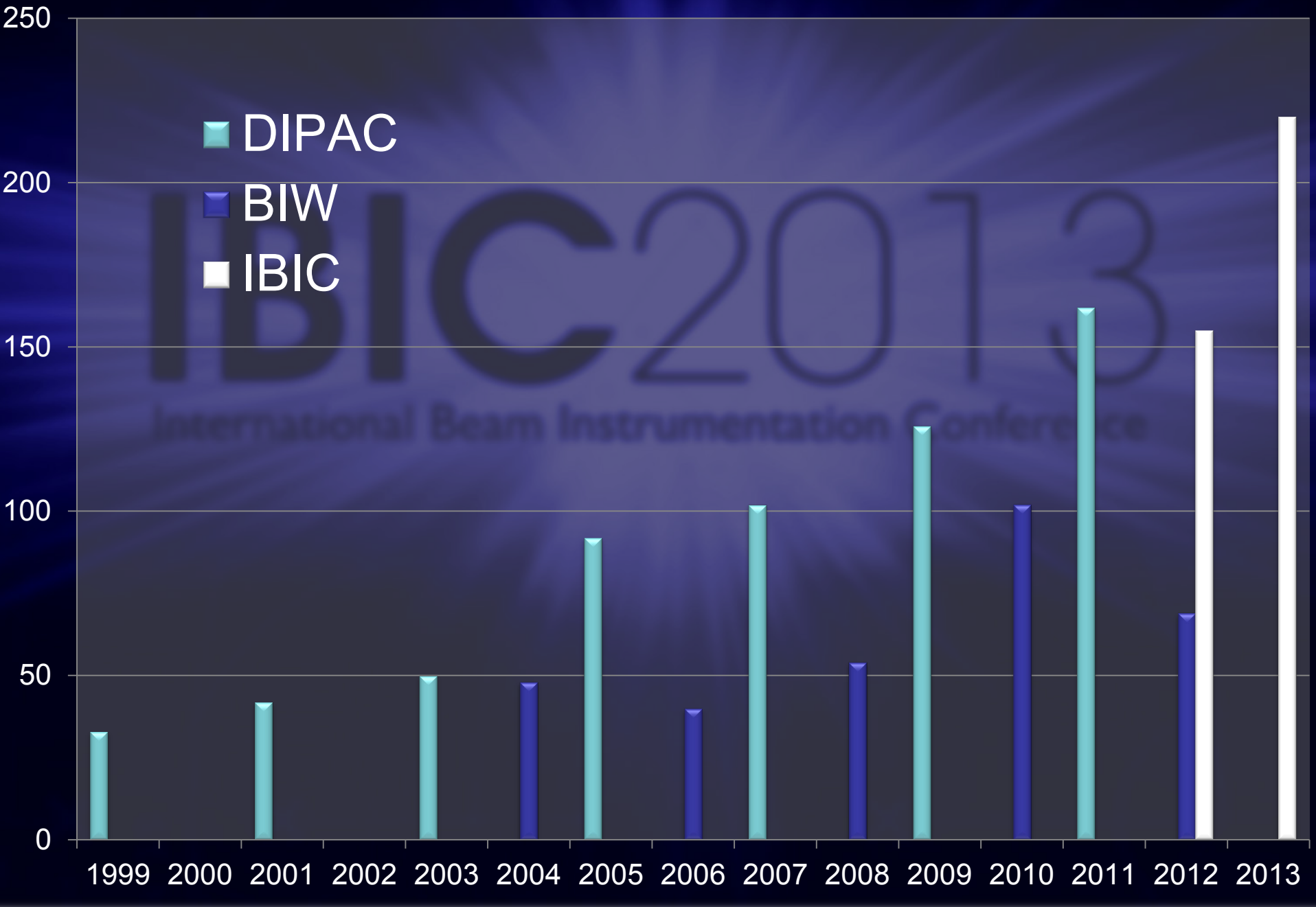

Courtesy of Diamond Light Source


• Sensor
• Digitizer
• Post process
Courtesy of Diamond Light Source


Courtesy of Diamond Light Source


Courtesy of Rok Ursic

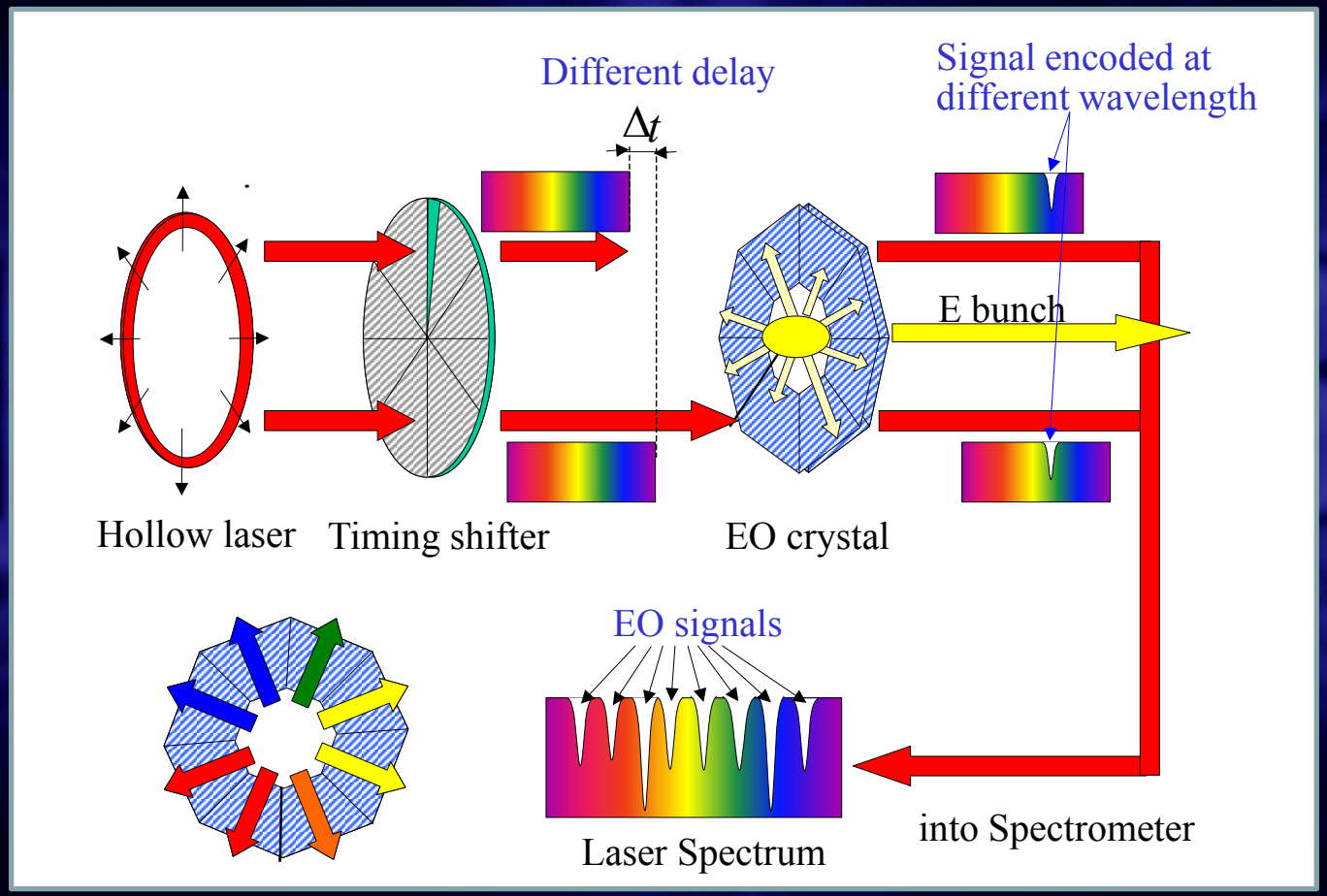
Poster Numbers



How to select highlights?

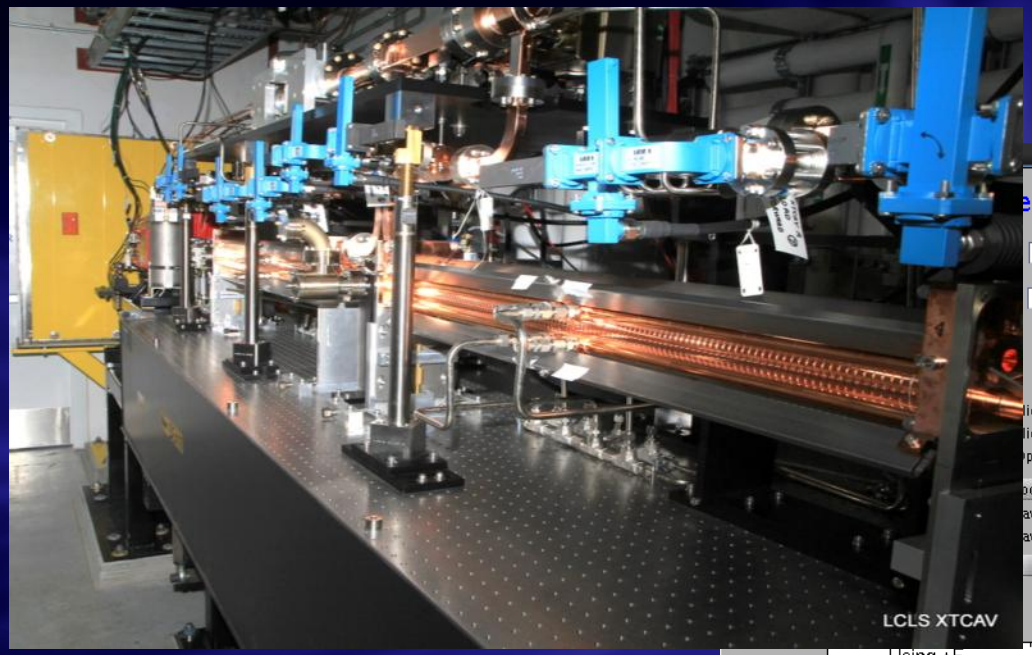
- Personal preference?
  - Would be biased to light sources
  - Impossible to even have read everything (>1000 pages)
- Audience clap factor?
  - Nice, but not measured!
  - What about posters?
- Both would not have provided any new information!
- **Select conference contributions which have been followed up by reviewed paper publications!**
  - links to conference papers (JACoW) and journals (DOI)
- **Big European projects currently in design or coming online!**
  - links to conference papers (JACoW)

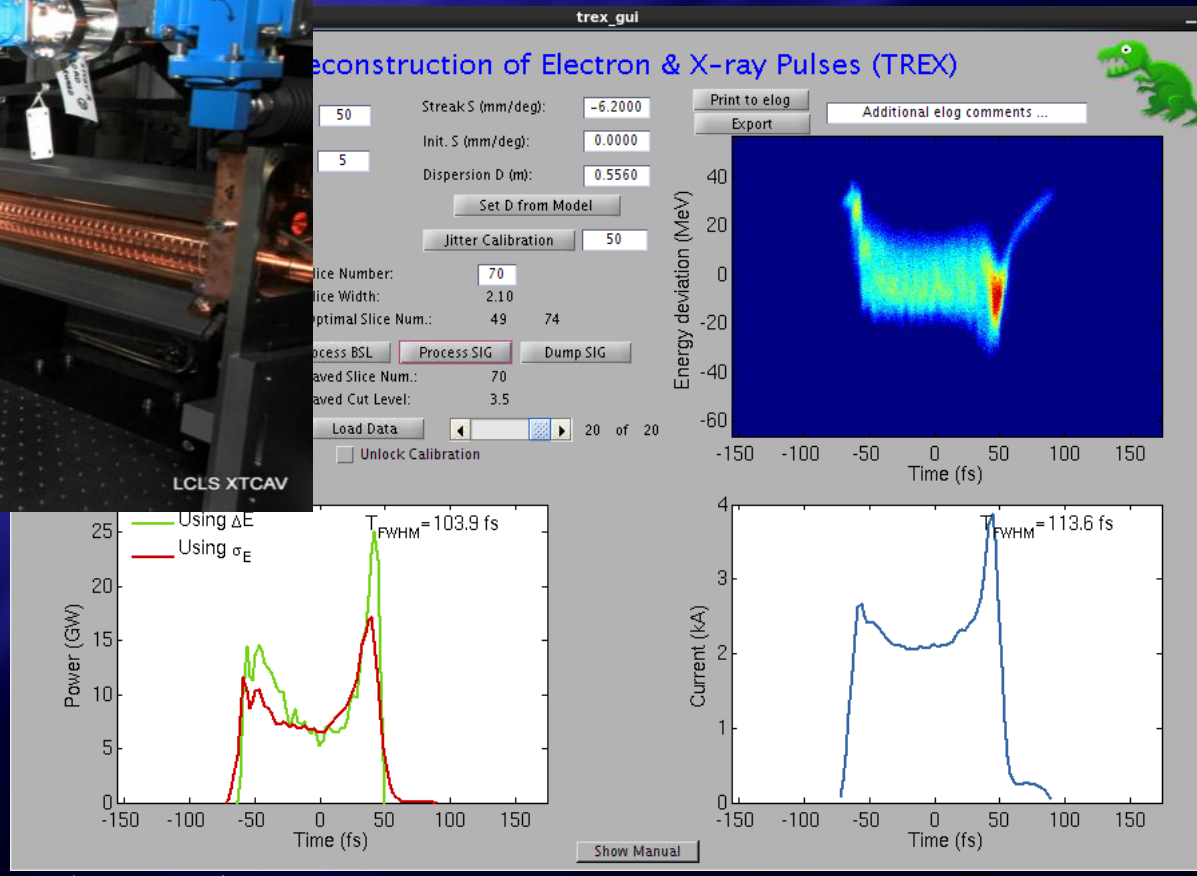
3D Electro Optical Sampling



- **MOAL2 H. Tomizawa et al *(RIKEN Spring-8)***
  Physical Review ST Accelerators and Beams
  Feasibility study of a single-shot 3D electron bunch shape monitor with an electro-optic sampling technique
  10.1103/PhysRevSTAB.16.052801

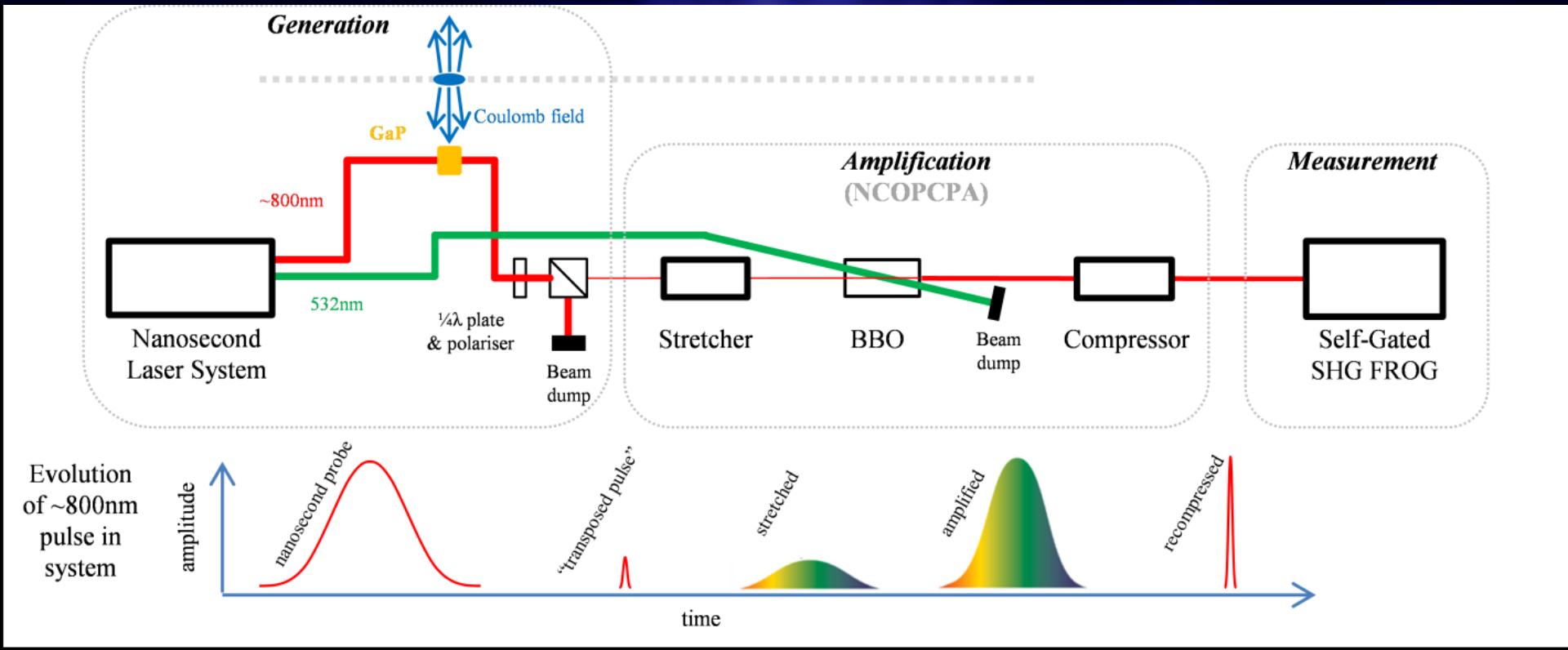
Transverse Deflecting Cavity: fs Resoluion





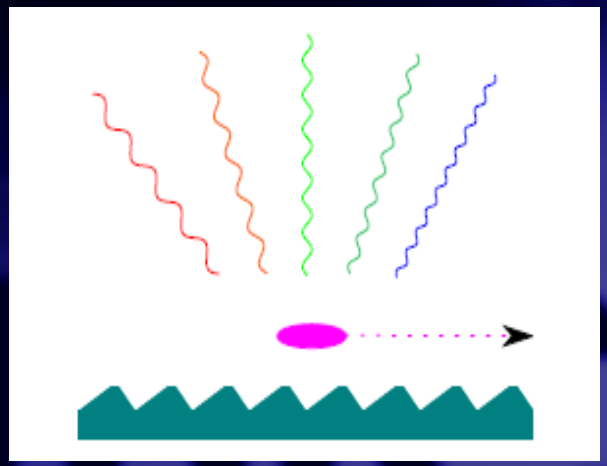
- **TUAL2** **P. Krejcik et al *(SLAC)***
  Nature Communications
  Few-femtosecond time-resolved measurements of X-ray free-electron lasers 10.1038/ncomms4762

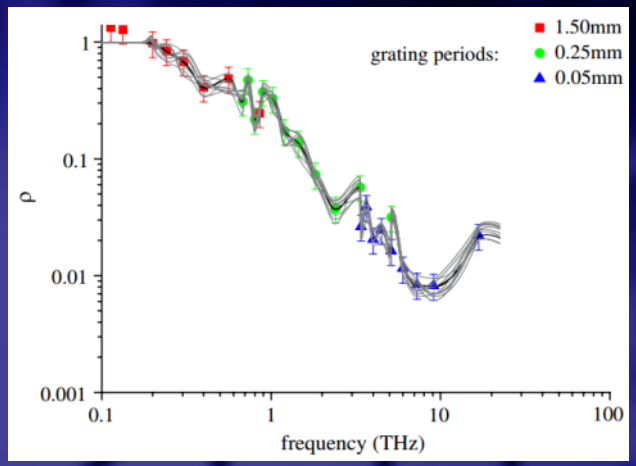
fs Resolution EO using ns-Pulse Laser

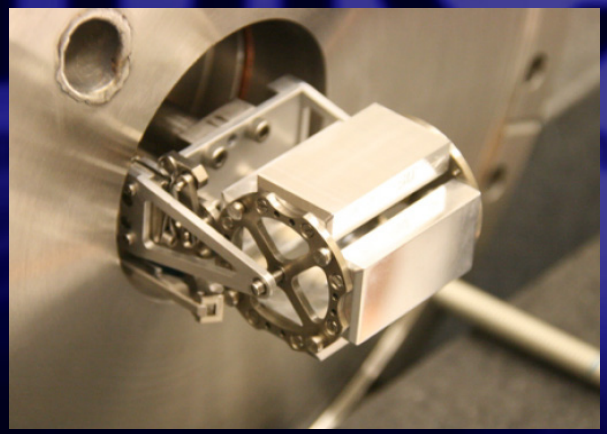


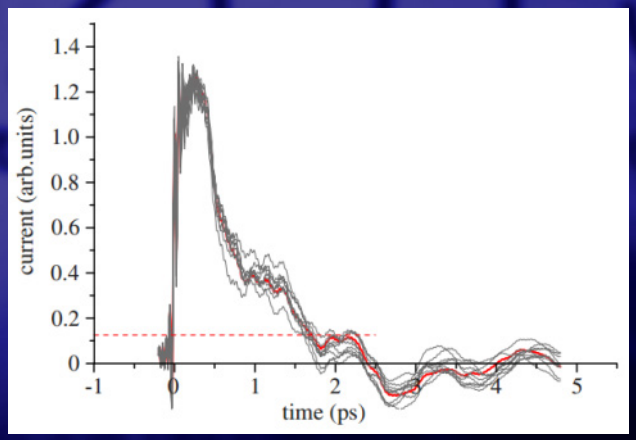
- **TUPC41 S. Jamison et al *(STFC/ASTeC)***
  Optics Express
  Role of misalignment-induced angular chirp in the electro-optic detection of THz waves 10.1364/OE.22.012028

Sub-ps profile from Smith-Purcell-Radiation



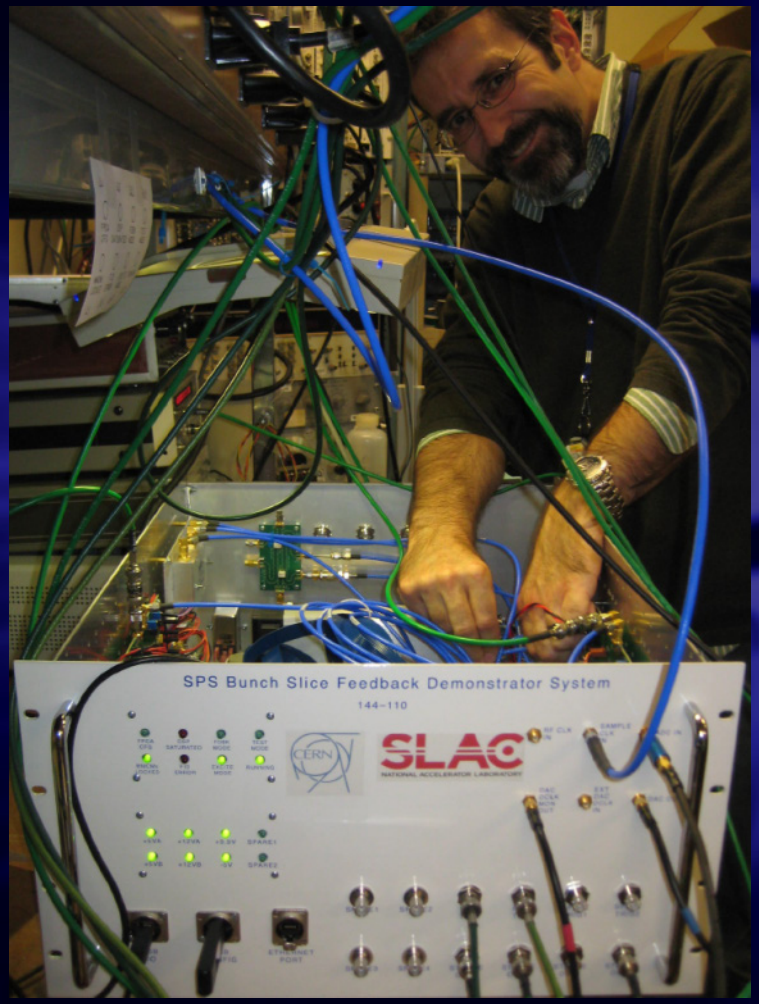


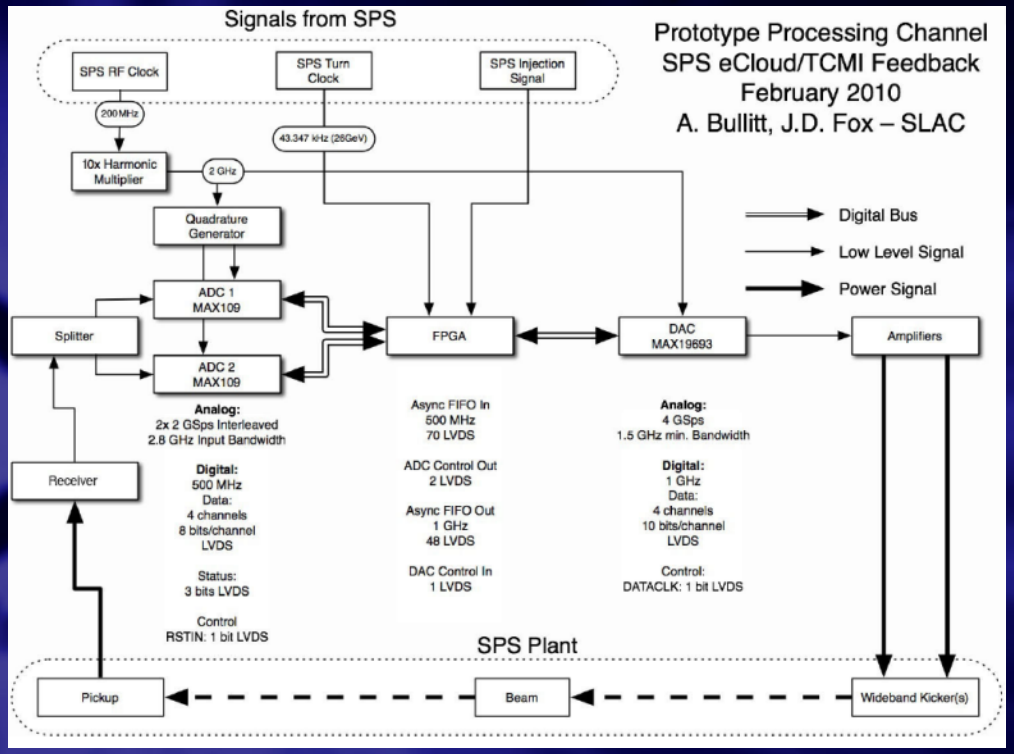


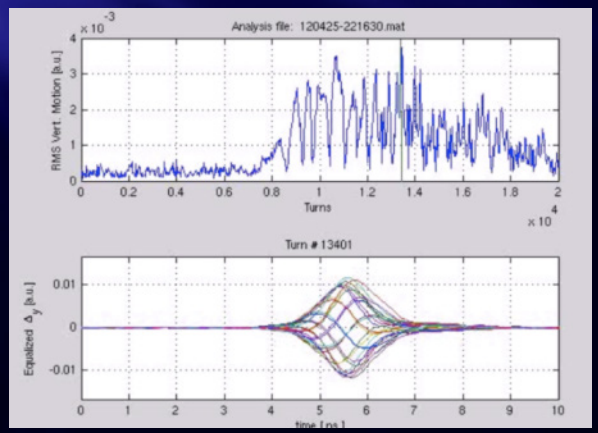


- **TUPC38 N. Delerue et al (LAL Orsay)**
  Physical Review ST Accelerators and Beams
  Reconstruction of the time profile of 20.35 GeV, subpicosecond long electron bunches by means of coherent Smith-Purcell radiation 10.1103/PhysRevSTAB.17.052802

Intra-bunch Feedback at 4GS/s



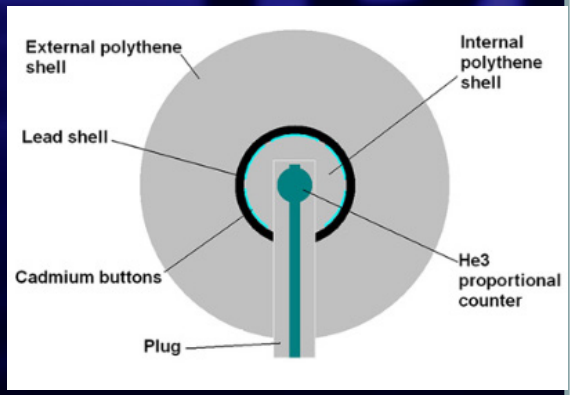


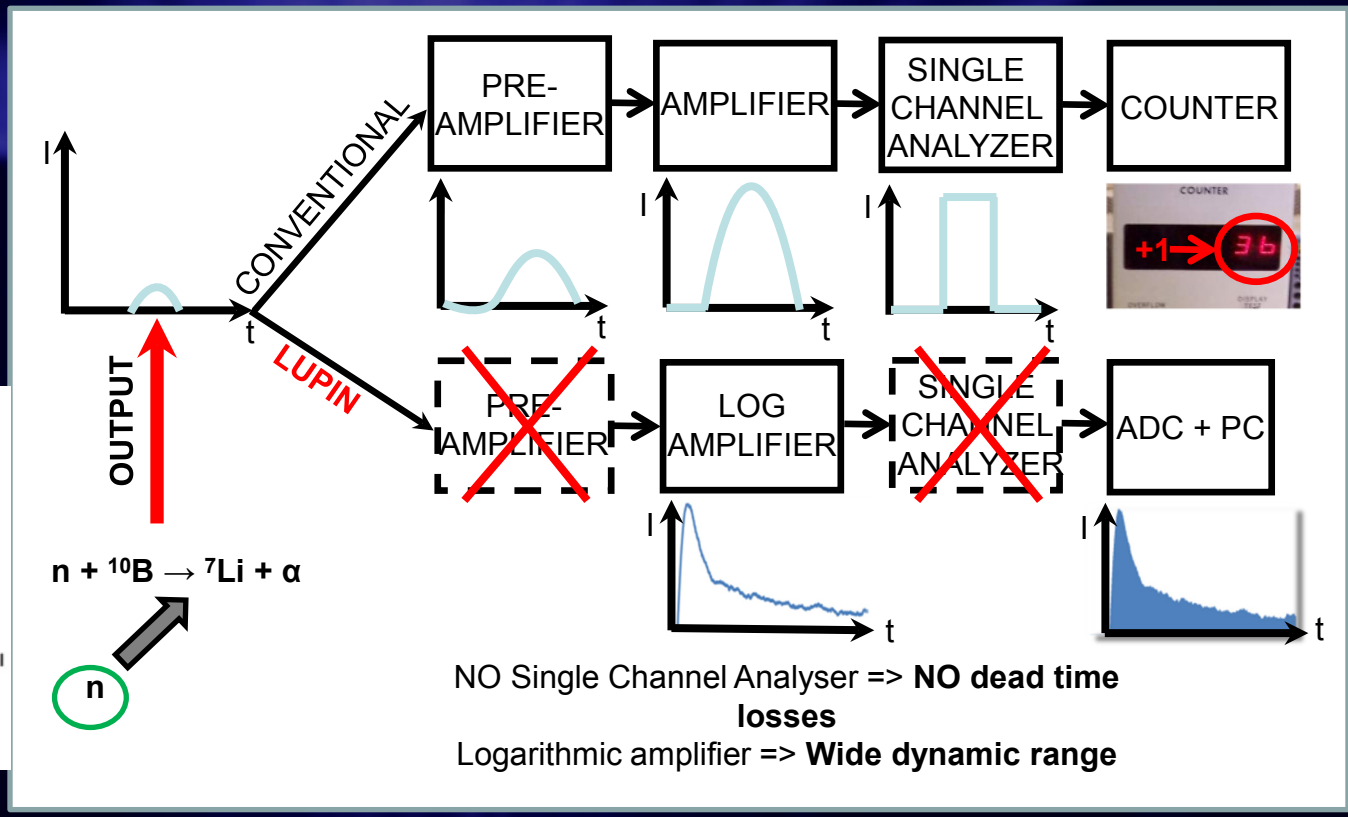


- **TUBL2** J. Fox et al *(SLAC/CERN)*
  Follow up contributions
  at PAC2013 FROAA3 TUPAC25
  at IPAC2014 TUPRI085 TUPRI086 TUPRI087

LUPIN Detector

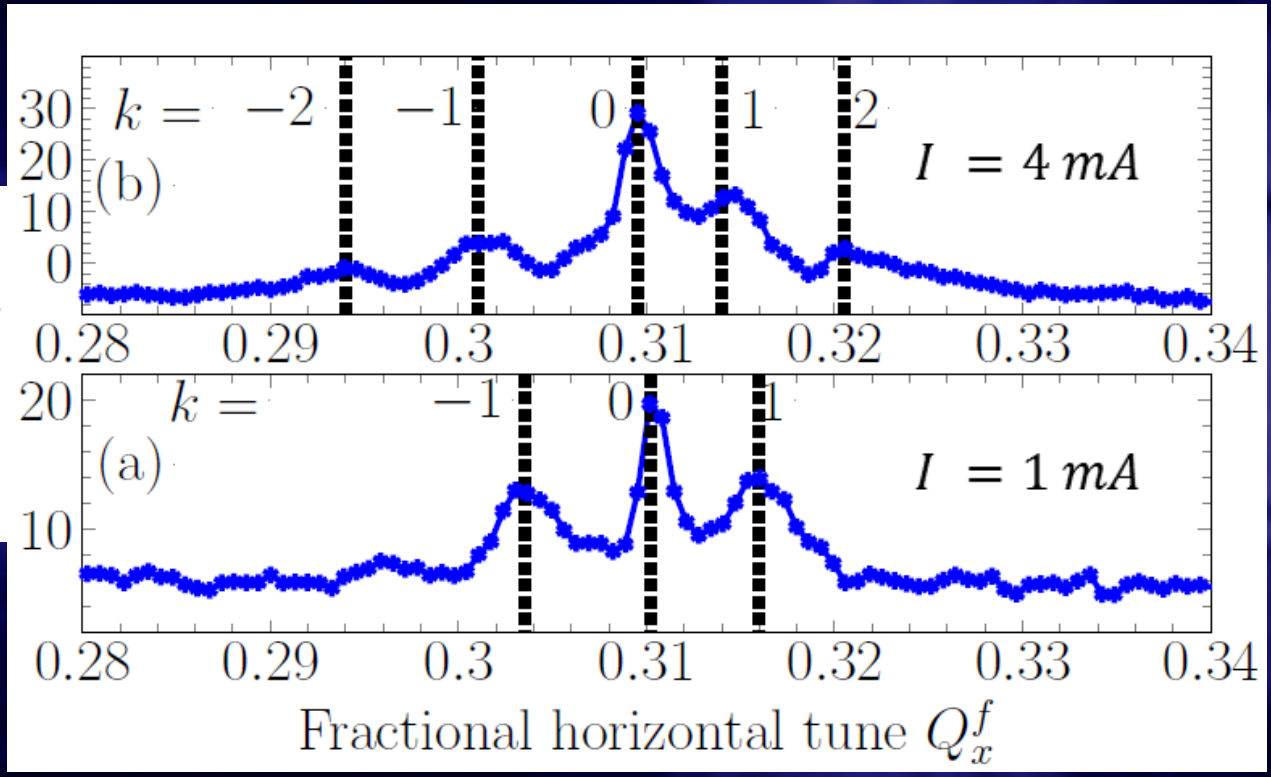
Long interval, Ultra-wide dynamic, PIle-up free, Neutron rem counter





- **WECL3** G.P. Manessi et al *(CERN/Cockcroft/U Milan)*
  Review of Scientific Instruments
  A new version of the LUPIN detector: Improvements and latest experimental verification 10.1063/1.4879936

Transverse Tune Spectra

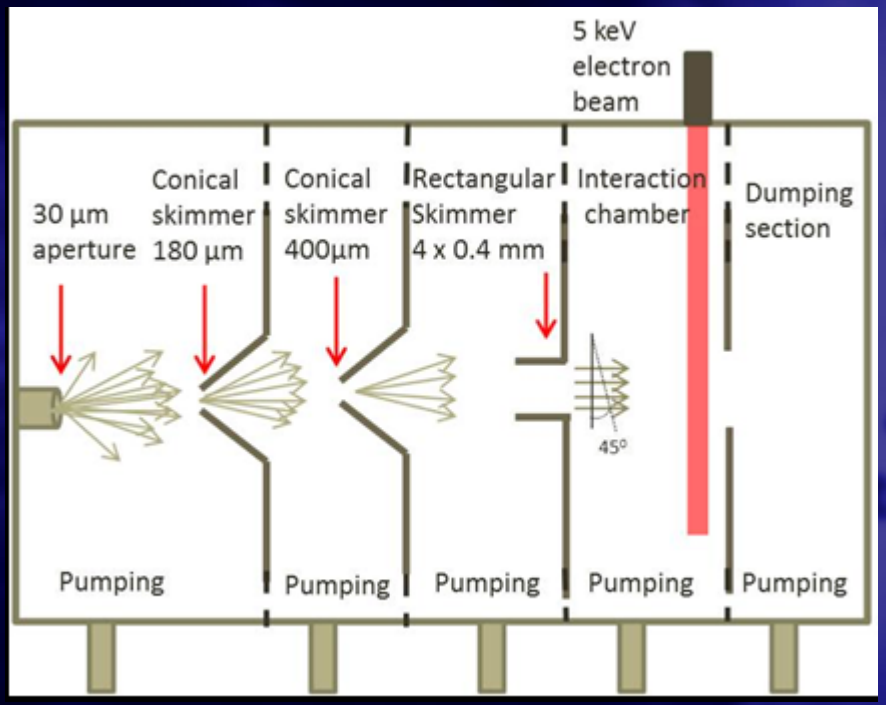


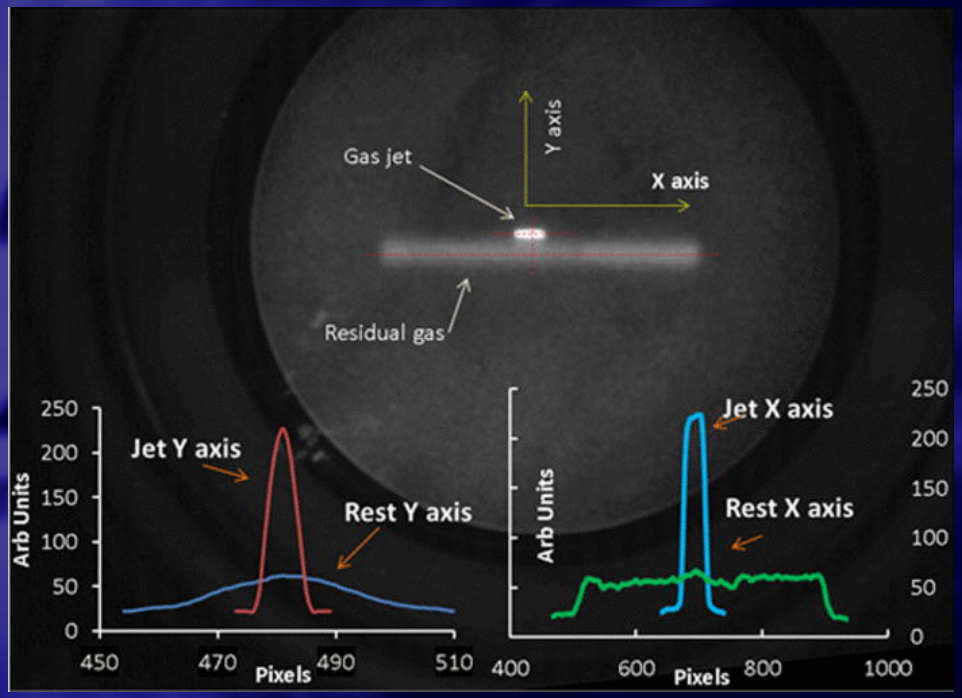
Higher current: The „global“ peak moves to the left. The symmetry of the spectrum is broken.

Low current: Tune spectra has symmetric sidebands due to synchrotron motion.

- **THAL1 R. Singh et al *(GSI)***
  Physical Review ST Accelerators and Beams
  Interpretation of transverse tune spectra in a heavy-ion synchrotron at high intensities
  10.1103/PhysRevSTAB.16.034201

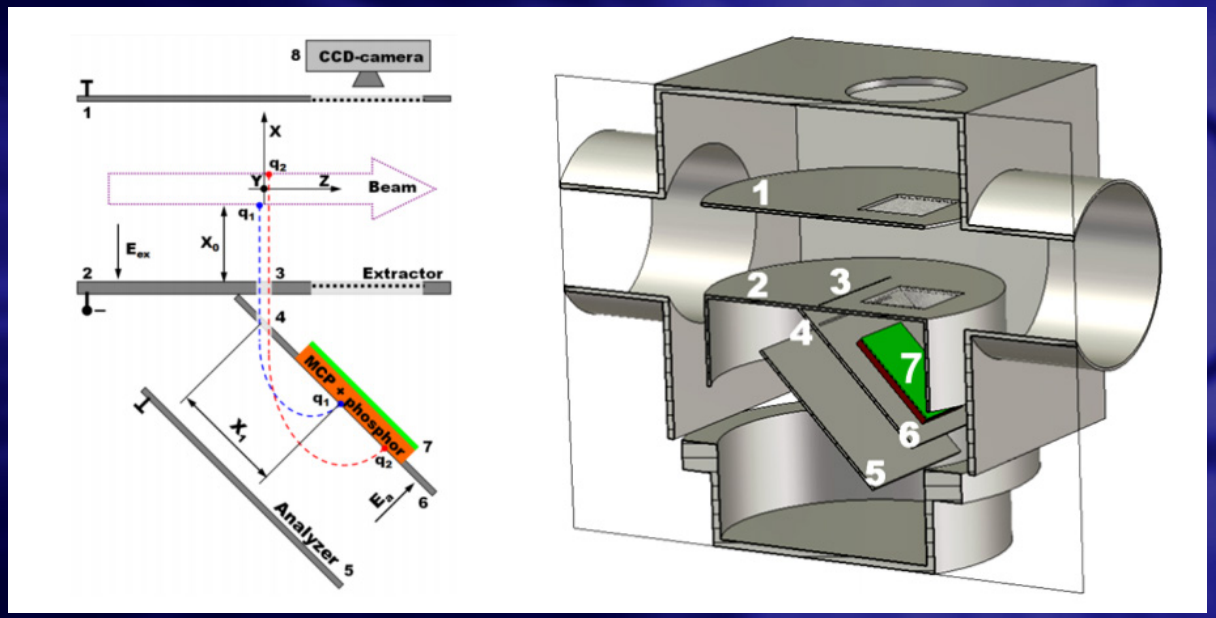
Gas Jet Curtain for Beam Profiling

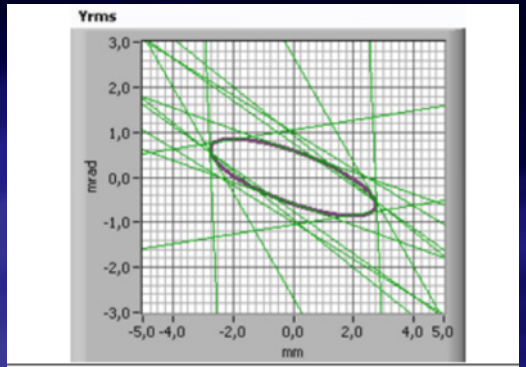




- **WEPF01** **V. Tzoganis et al (*Cockcroft Institute*)**
  Applied Physics Letters
  A non-invasive beam profile monitor for charged particle beams
  10.1063/1.4879285

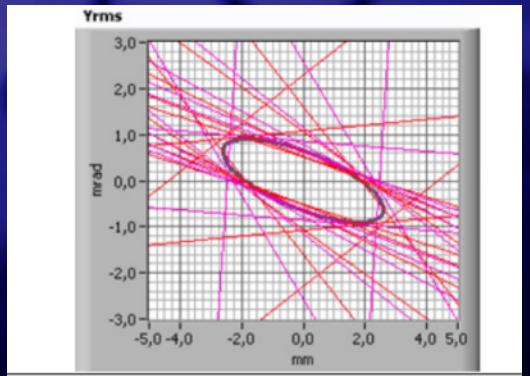
2D Ionisation Profile Monitor





$\varepsilon_Y = 1.6234\ mm \cdot mrad$

This device

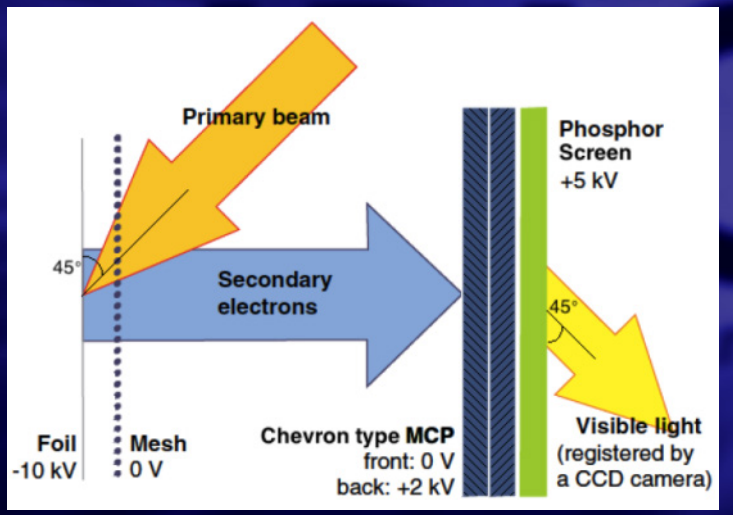


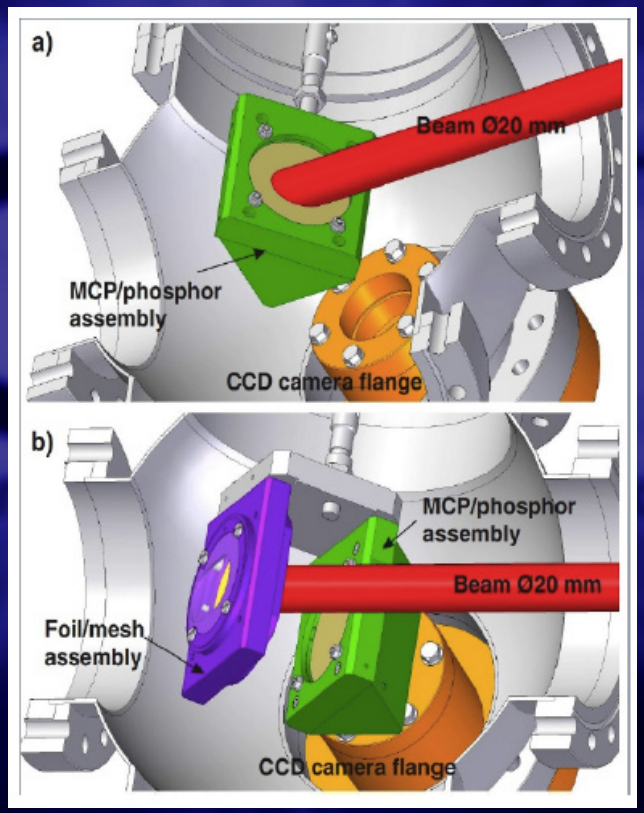
$\varepsilon_Y = 1.6949\ mm \cdot mrad$

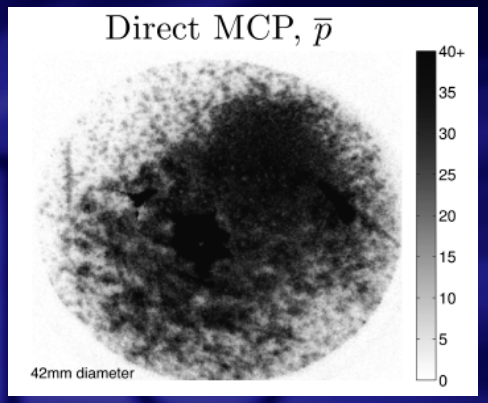
Wire scanners

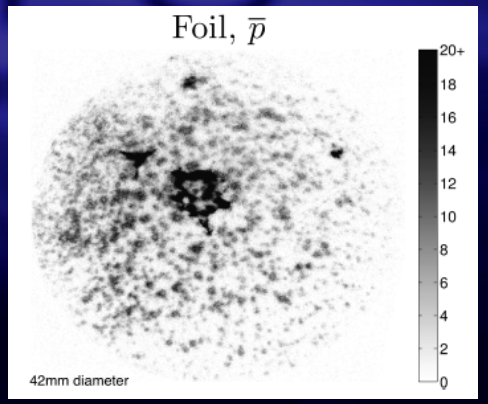
- **TUPF16 S. Gavrilov et al *(RAS/INR)***
  Journal of Instrumentation
  Two-dimensional non-destructive diagnostics for accelerators by Beam Cross section Monitor 10.1088/1748-0221/9/01/P01011

Secondary Emission Monitor for keV Ion and Antiproton Beams



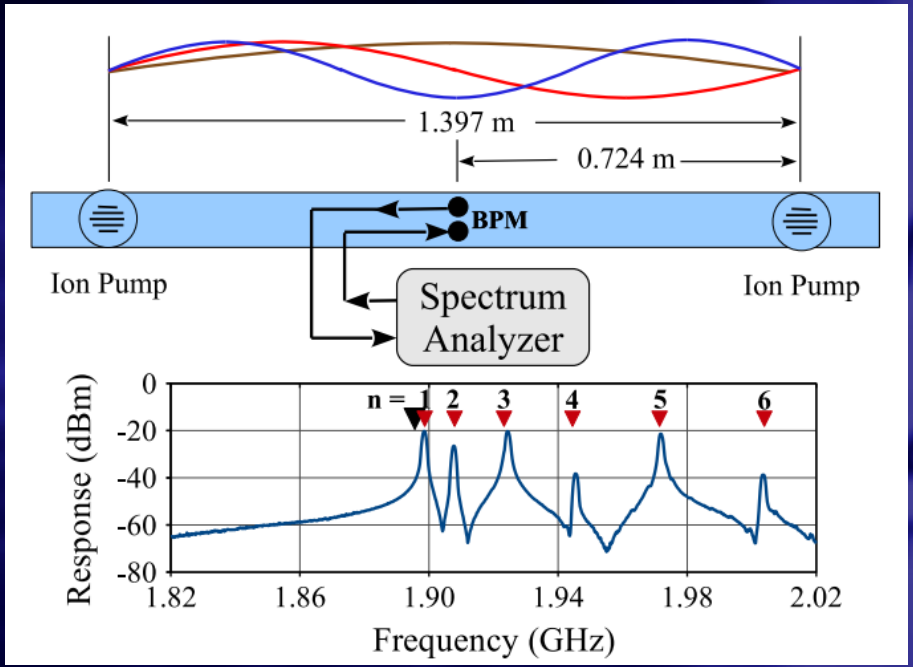


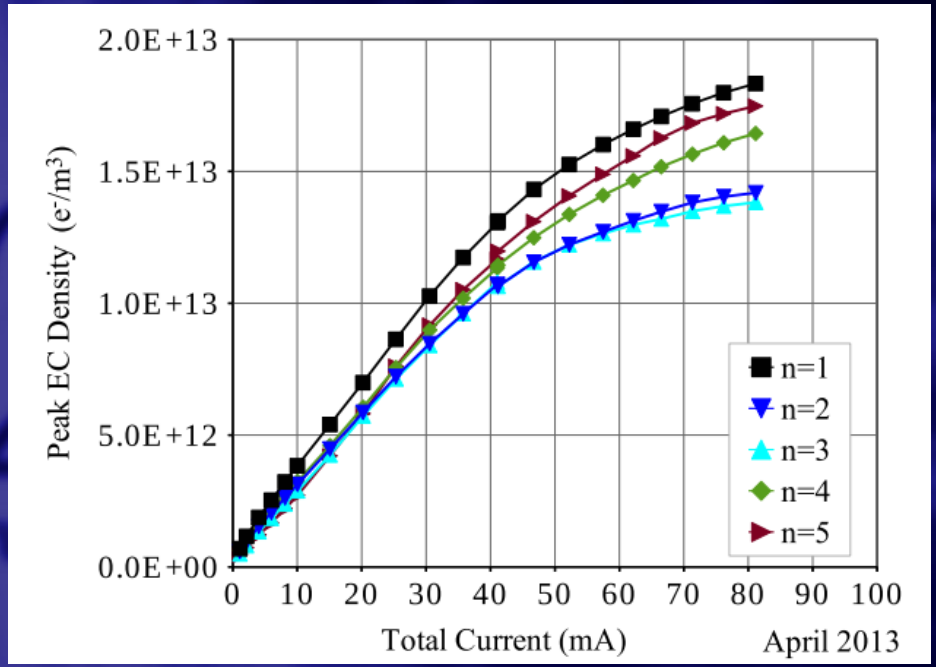




- **TUPF02** A. Sosa et al *(CERN/Cockcroft)*
  Hyperfine Interactions
  Investigations into beam monitors at the AE$\bar{g}$IS experiment
  10.1007/s10751-014-1032-9

Electron Cloud Measurements

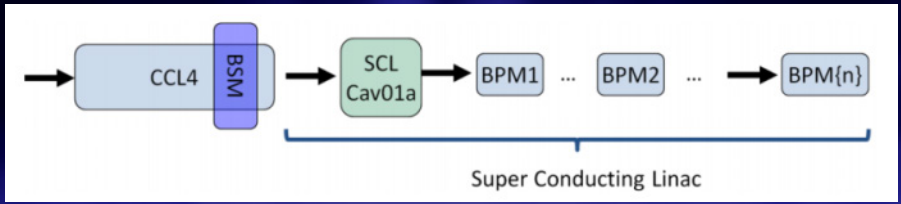


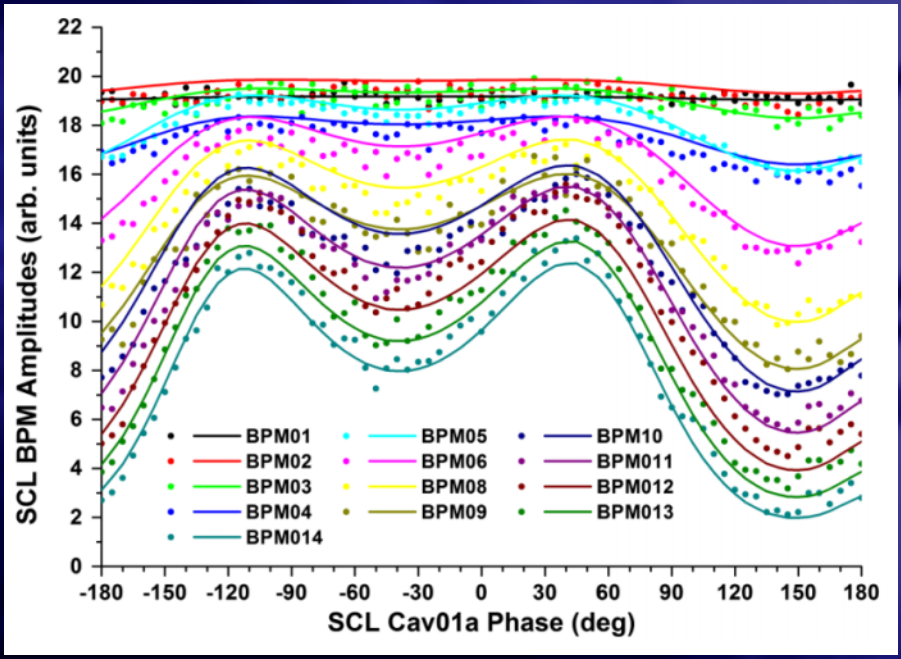


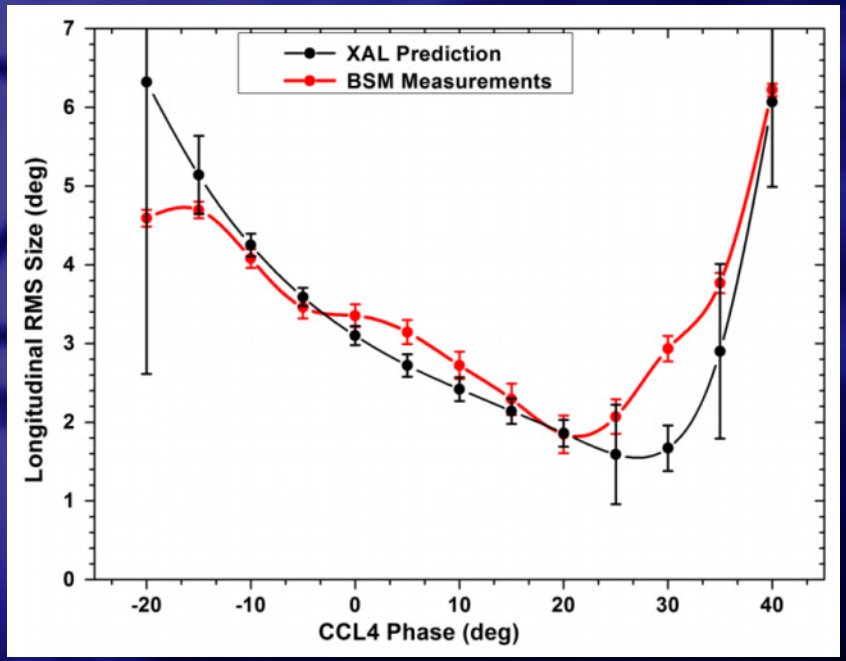
- **TUPF34 J. Sikora et al *(CLASSE)***
  NIM-A: Accelerators, Spectrometers, Detectors and Associated Equipment
  Electron cloud density measurements in accelerator beam-pipe using resonant microwave excitation
  10.1016/j.nima.2014.03.063

More in John's talk on Thursday

Bunch Profile from BPM Amplitudes

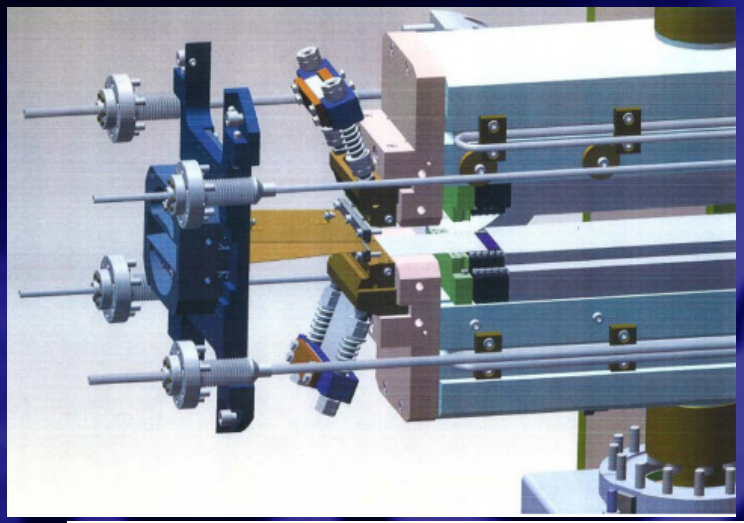


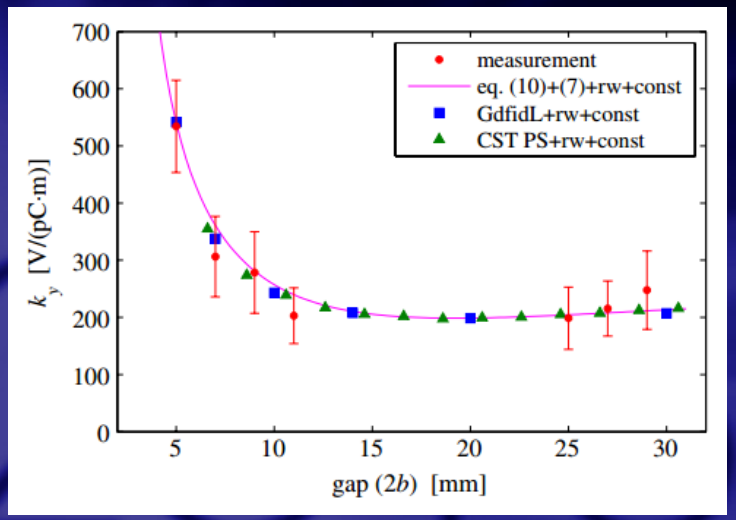


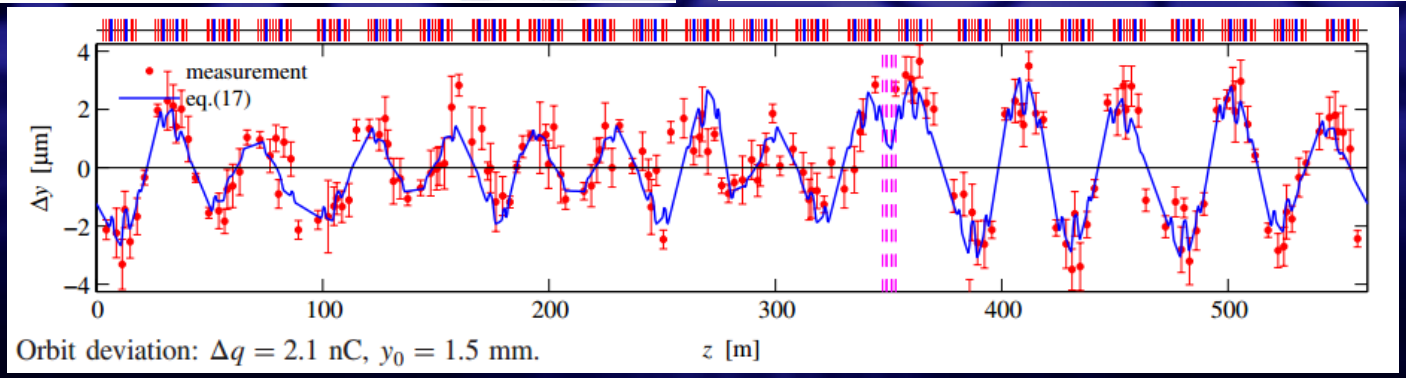


- **MOPC40 A. Aleksandrov et al *(SNS/ORNL)***
  Physical Review ST Accelerators and Beams
  Noninterceptive method to measure longitudinal Twiss parameters of a beam in a hadron linear accelerator using beam position monitors 10.1103/PhysRevSTAB.16.062801

In-vac Undulator Impedance Measurement



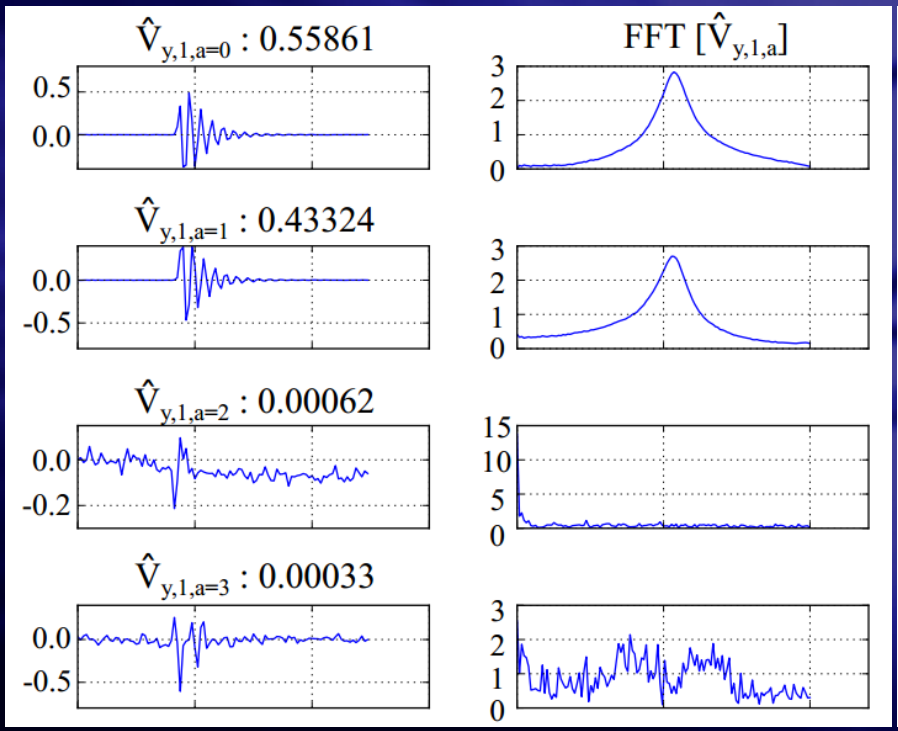


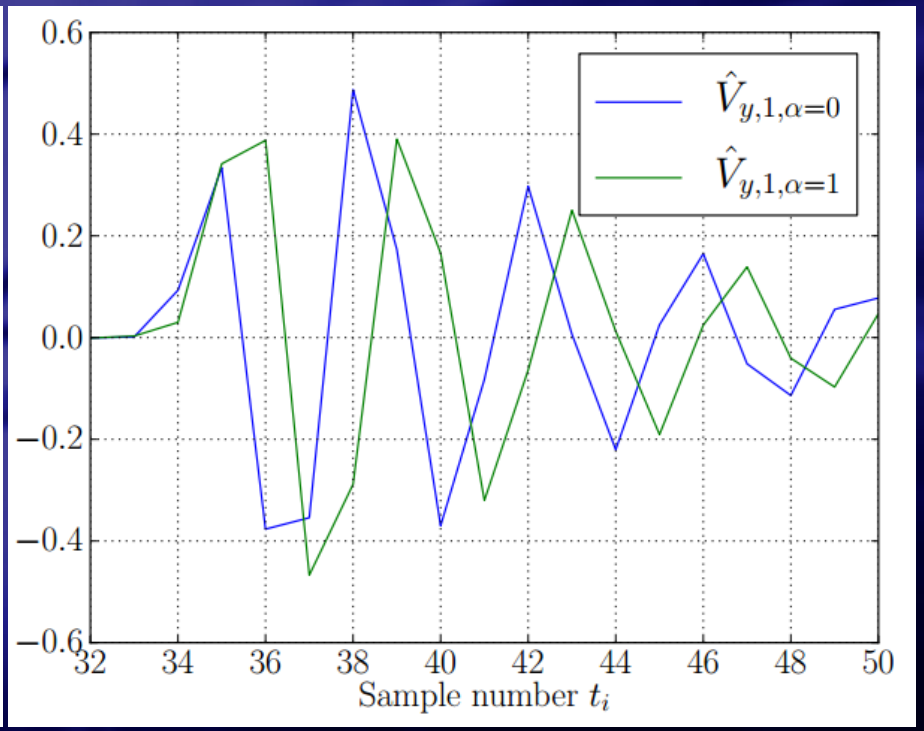


- **TUPC11 V. Smaluk et al *(DLS)***
  Physical Review ST Accelerators and Beams
  Coupling impedance of an in-vacuum undulator: Measurement, simulation, and analytical estimation
  10.1103/PhysRevSTAB.17.074402

Principal Component Analysis of Raw Cavity-BPM Signals

$$\mathbf{d} = \mathbf{USV}^{\mathbf{T}}$$





- **FRWAJ6** **Y.-I. Kim et al *(JAI/KEK ATF)***
  Journal of Instrumentation
  Principal Component Analysis of cavity beam position monitor signals *10.1088/1748-0221/9/02/P02007*

8 x Swiss Free Electron Laser

- Instrumentation and Results from the **SwissFEL** Injector Test Facility
- First Results from the Bunch Arrival-Time Monitor at the **SwissFEL** Test Injector
- Characterization of Compressed Bunches in the **SwissFEL** Injector Test Facility
- Development of Electron Bunch Compression Monitors for **SwissFEL**
- Design of the **SwissFEL** BPM System
- A Generic BPM Electronics Platform For European XFEL, **SwissFEL** and SLS
- Bunch Length Measurements Using Correlation Theory in Incoherent Optical Transition Radiation
- Wake Field Monitors in a Multi Purpose X Band Accelerating Structure

9 x European Spallation Source

- System Overview and Design Considerations of the BPM System of the **ESS** Linac
- Overview of the European Spallation Source Warm Linac Beam Instrumentation
- Beam Instrumentation in the **ESS** Cold Linac
- System Overview and Preliminary Test Results of the **ESS** Beam Current Monitor System
- Beam Loss Monitoring at the European Spallation Source
- Overview of the **ESS**-Bilbao Mobile Diagnostics Test Stand
- Test Bench Experiments for Energy Measurement and Beam Loss of **ESS**-Bilbao
- Wire Scanner Design for the European Spallation Source
- Proton Beam Measurement Strategy for the 5 MW European Spallation Source Target

10 x Facility for Antiproton and Ion Research

- Transverse Beam Profiling for **FAIR**
- Test of a Non-Invasive Bunch Shape Monitor at GSI High Current LINAC
- Response of Scintillating Screens to Fast and Slow Extracted Ion Beams
- A Cryogenic Current Comparator for **FAIR** with Improved Resolution
- Measurements with the Upgraded Cryogenic Current Comparator
- A FESA DAQ for Fast Current Transformer in SIS 18
- Layout of the BPM System for p-LINAC at **FAIR** and the Digital Methods for Beam Position and Phase Monitoring
- Current Status of the Schottky Cavity Sensor for the CR at **FAIR**
- Beam Loss Monitoring Study for SIS100@**FAIR**
- FPGA Based Fast Orbit Feedback Data Acquisition System for Electron and Hadron Storage Rings

11 x European X-Ray Free Electron Laser

- Scintillating Screen Monitors for Transverse Electron Beam Profile Diagnostics at the European **XFEL**
- Pickup Signal Improvement for High Bandwidth BAMs for FLASH and European – **XFEL**
- New Design of the 40 GHz Bunch Arrival Time Monitor Using MTCA.4 Electronics at FLASH and for the European **XFEL**
- Comparative Analysis of Different Electro-Optical Intensity Modulator Candidates for the New 40 GHz Bunch Arrival Time Monitor System for FLASH and European **XFEL**
- Design and Beam Test Results of Button BPMs for the European **XFEL**
- Grounded Coplanar Waveguide Transmission Lines as Pickups for Beam Position Monitoring in Particle Accelerators
- Development Status of Optical Synchronization for the European **XFEL**
- Femtosecond Stable Laser-to-RF Phase Detection for Optical Synchronization Systems
- Precision Synchronization of Optical Lasers Based on MTCA.4 Electronics
- New Design of High Order Modes Electronics in MTCA.4 Standard for FLASH and the European **XFEL**
- Upgrade of the Read-out Electronics for the Energy Beam Position Monitors at FLASH and European **XFEL**

17 x Large Hadron Collider / Injector Upgrade

- Turn by Turn Profile Monitors for the CERN SPS and **LHC**
- Performance Assessment of Wire-Scanners at CERN
- Overview of Laserwire Beam Profile and Emittance Measurements for High Power Proton Accelerators
- Design and Performance of the Upgraded **LHC** Synchrotron Light Monitor
- The **LHC** Fast Beam Current Change Monitor
- A Gigabit Ethernet Link for an FPGA Based Beam Loss Measurement System
- A 4 GS/s Feedback Processing System for Control of Intra-Bunch Instabilities
- The Hardware Implementation of the CERN SPS Ultrafast Feedback Processor Demonstrator
- Evaluation of Strip-line Pick-up System for the SPS Wideband Transverse Feedback System
- Tune Measurement from Transverse Feedback Signals in **LHC**
- Performance of Detectors using Diamond Sensors at the **LHC** and CMS
- A Prototype Readout System for the Diamond Beam Loss Monitors at **LHC**
- A Beam-Synchronous Gated Peak-Detector for the **LHC** Beam Observation System
- Beam Delivery Simulation (BDSIM): A Geant4 Based Toolkit for Diagnostics and Loss Simulation
- A Multiband-Instability-Monitor for High-Frequency Intra-Bunch Beam Diagnostics
- Design of a Novel Cherenkov Detector System for Machine Induced Background Monitoring in the CMS Cavern
- Operation of Silicon, Diamond and Liquid Helium Detectors in the Range of Room Temperature to 1.9 Kelvin and After an Irradiation Dose of Several Mega Gray

IBIC2013: Proceedings of the 2nd International Beam Instrumentation Conference

The links below lead to detailed listings of the IPAC 2013 Conference, including Portable Acrobat Format (PDF) files of all invited and contributed papers, slides from oral presentations and posters where available.

Index of papers by:

PROCEEDINGS VOLUME [489 MB]
The complete volume of papers

IBIC 2013 was hosted by Diamond Light Source, and held at the Saïd Business School from September 16–19, 2013 in Oxford, UK.

Editorial Board: Ian Martin, Guenther Rehm (Diamond Light Source)

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