ADAMAS 2014

Erich Griesmayer, CIVIDEC Instrumentation

19.11.2014

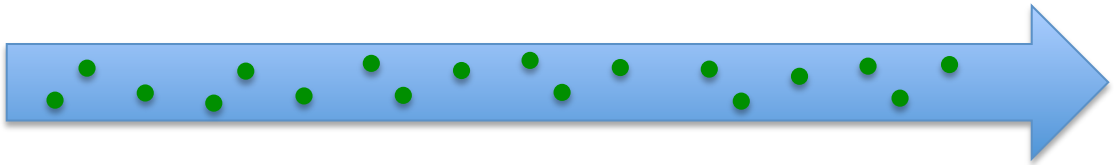
Content:

1. Neutrons
2. Spectroscopy
3. Emittance
4. Timing
5. XBPM

Pavel Kavrigin
TU Wien

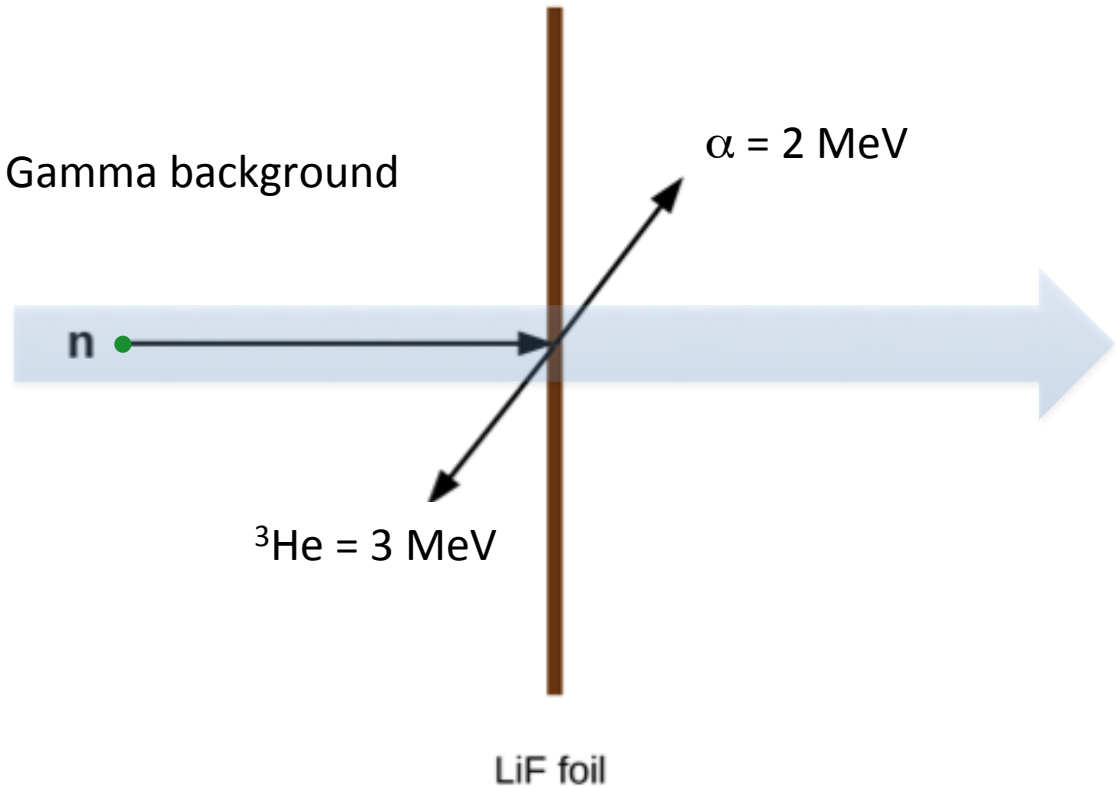
TRIGA - nuclear reactor

Thermal neutrons



Huge gamma background

Li - conversion



Pulse shapes

Alpha particles:

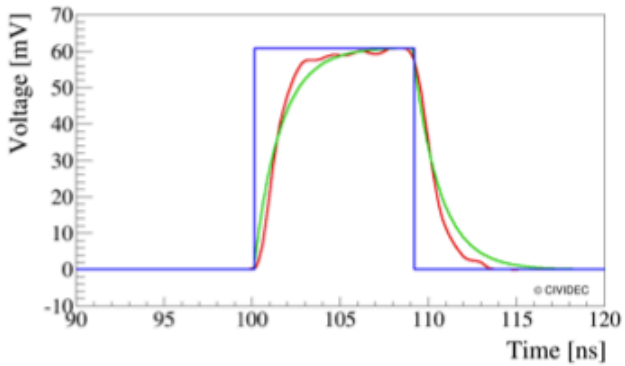


Figure 2. Rectangular pulse shape: ideal (blue), theoretical (green), measured (red).

Photons:

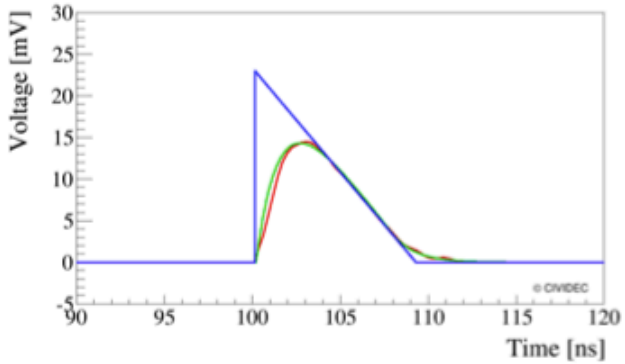
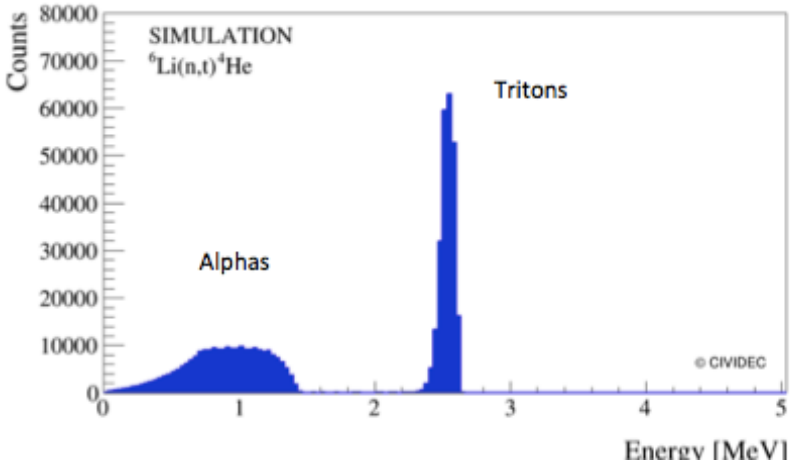
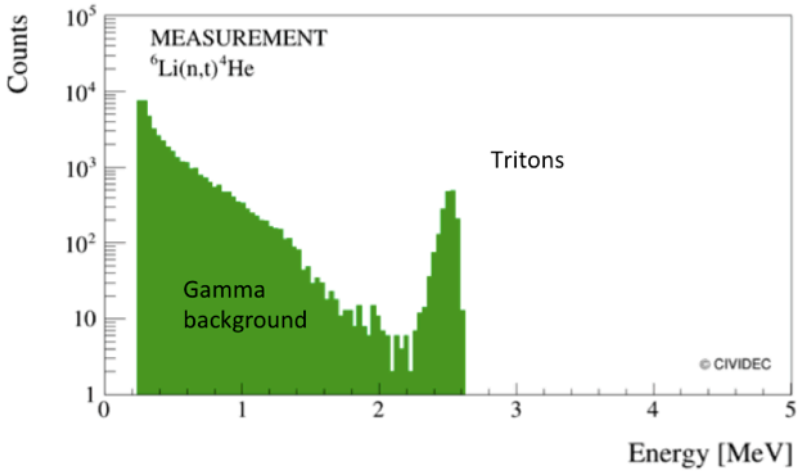
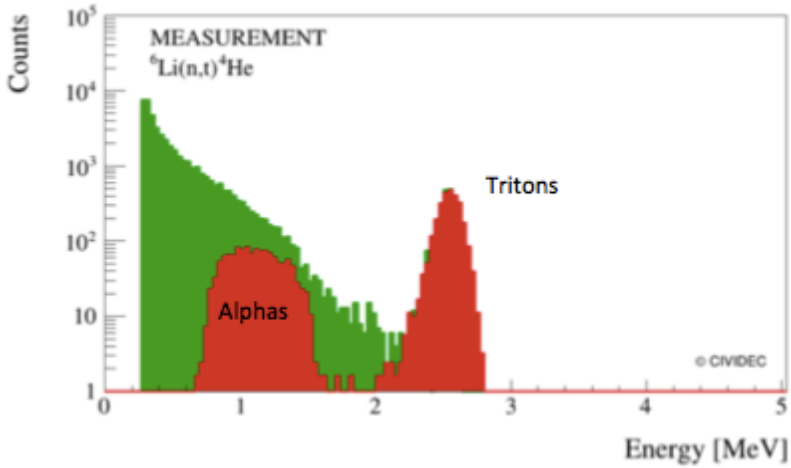


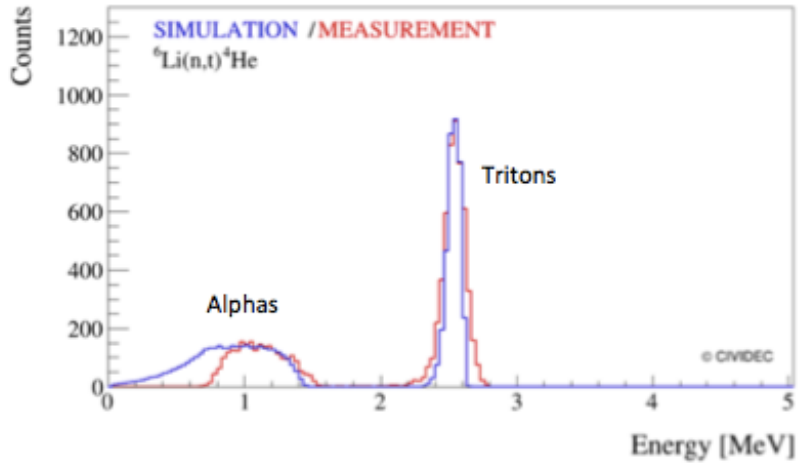
Figure 3. Triangular pulse shape: ideal (blue), theoretical (green), measured (red).

Pulse shape analysis









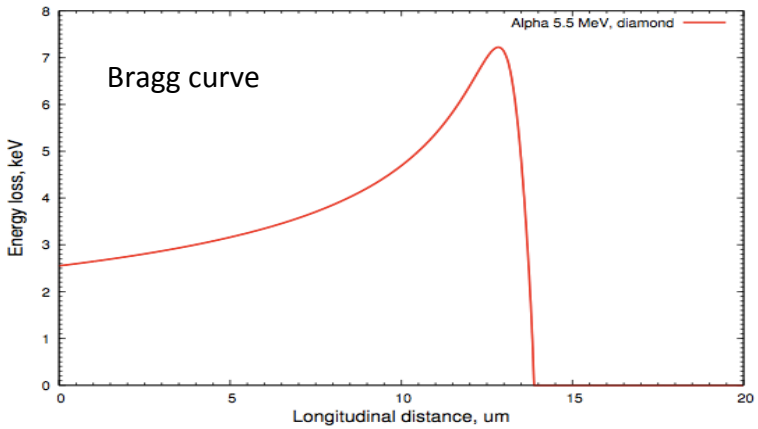
ROSY®

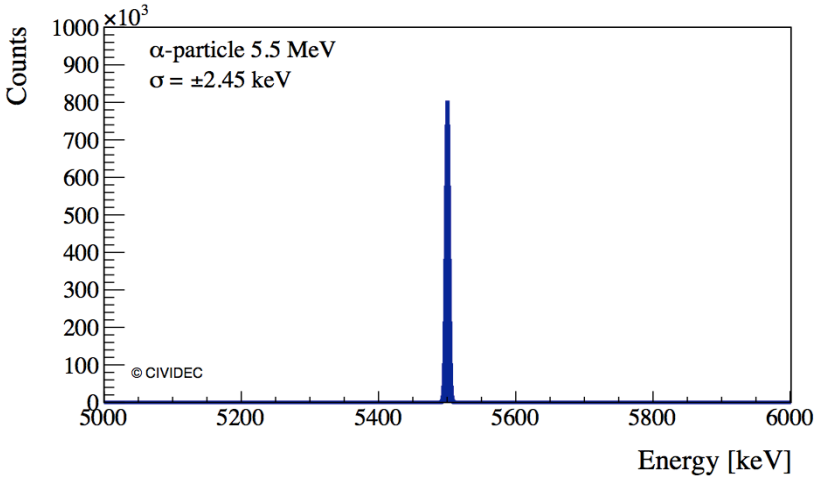
Real time processing

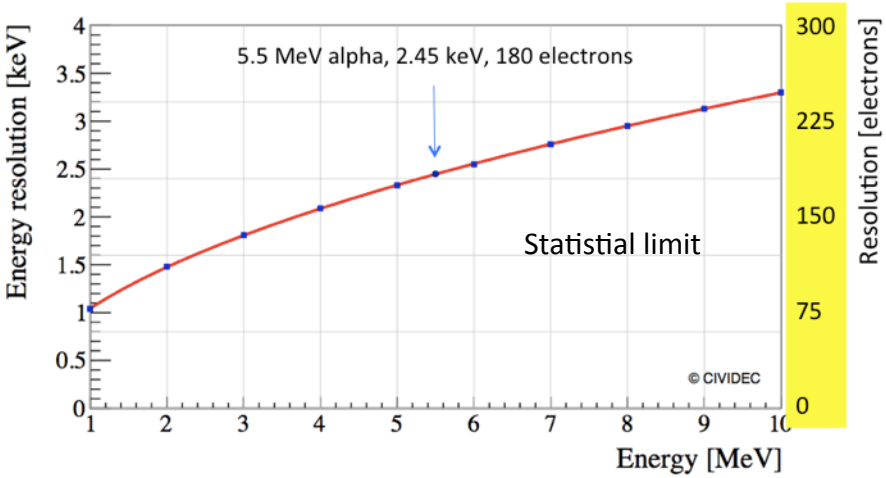
4 channels, 5 GS/s, FPGA, embedded server

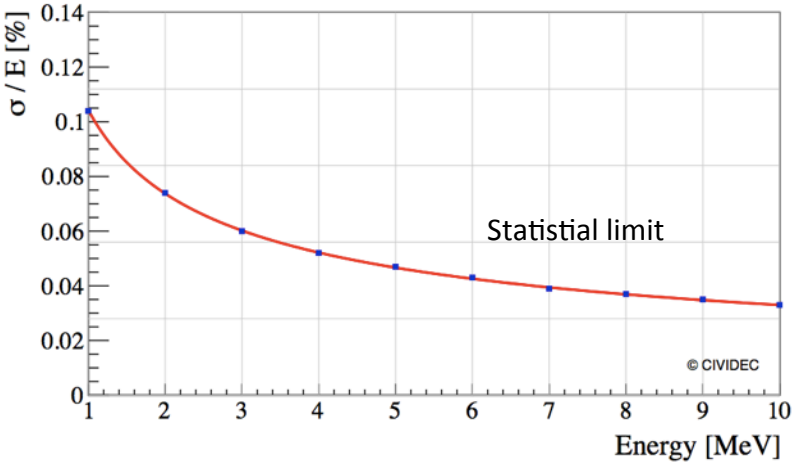
Matevz Cerv
CERN ATLAS

Ion spectroscopy

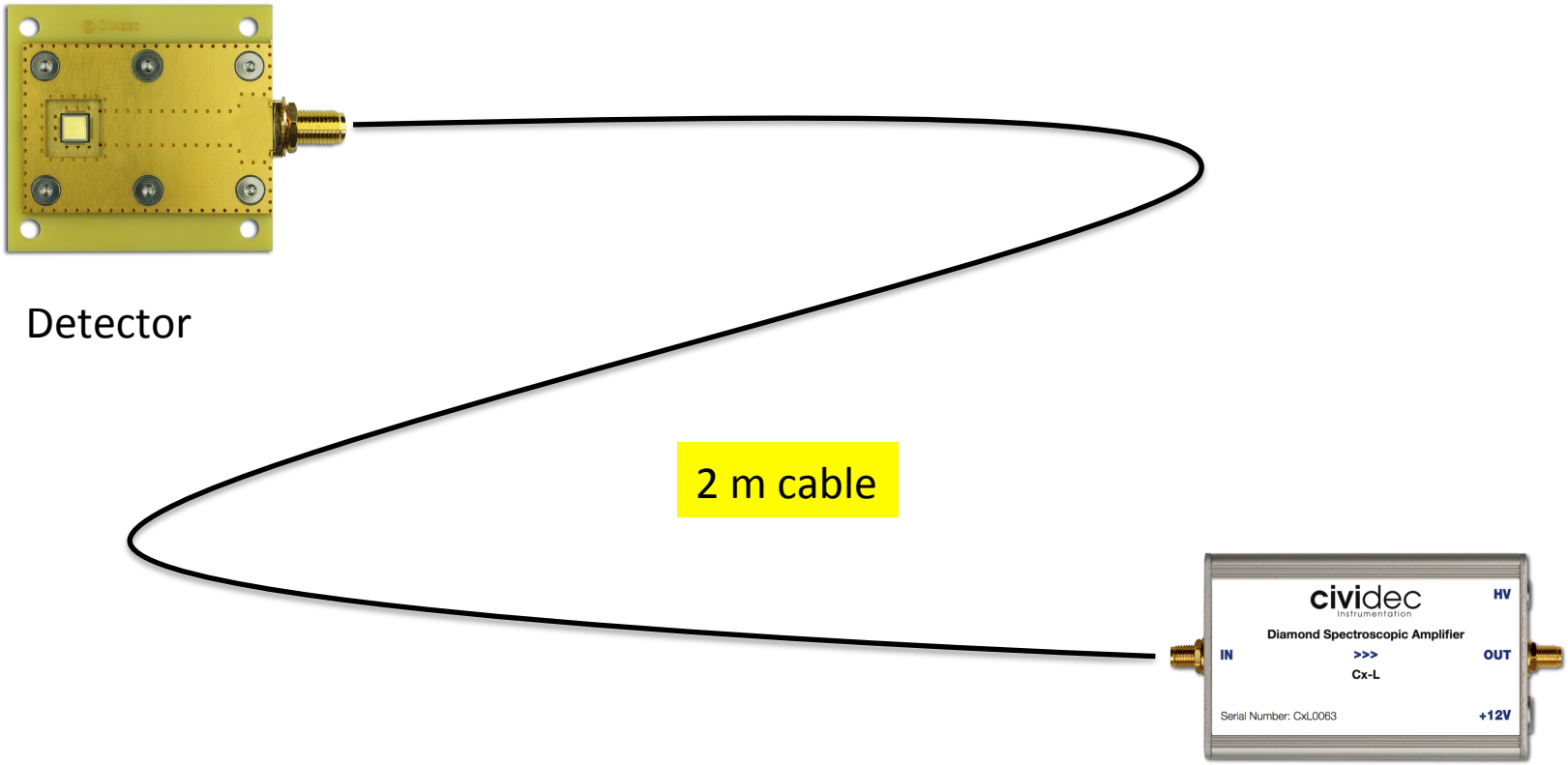




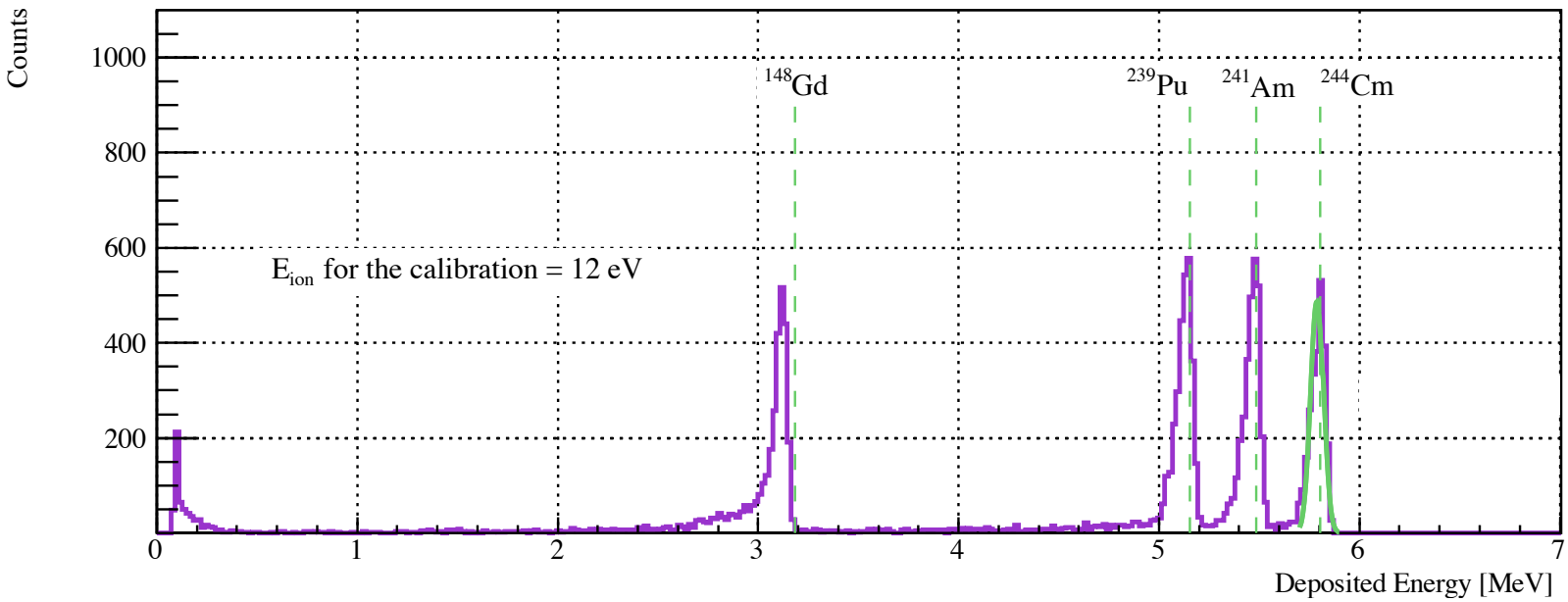




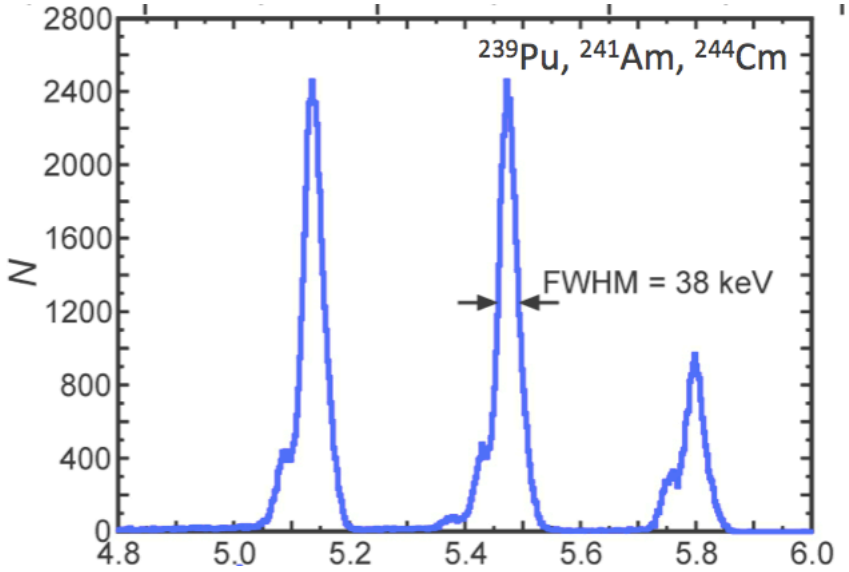
Spectroscopic Amlifier



CERN n_TOF

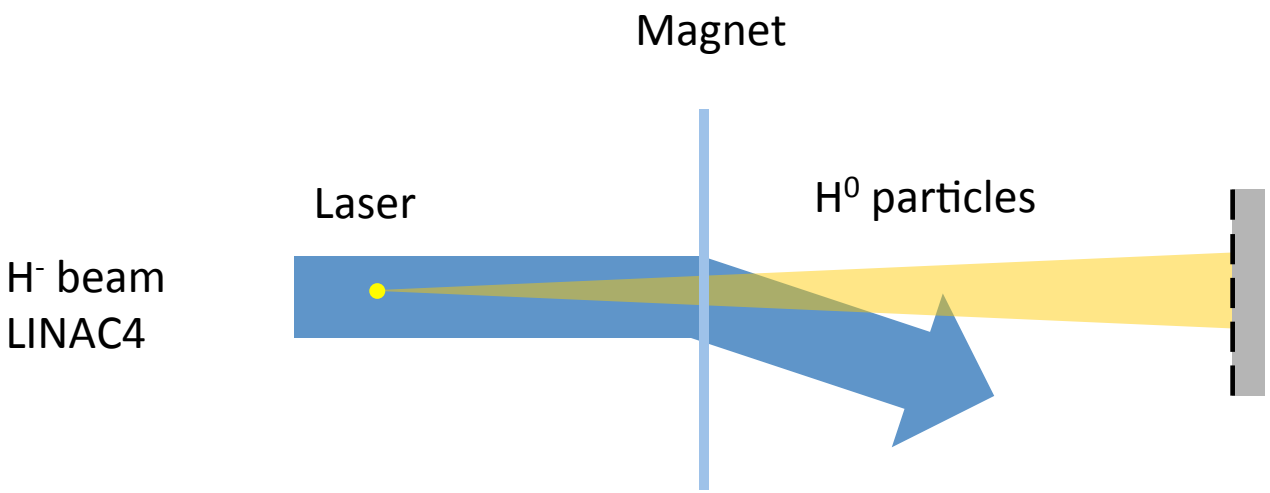

Counts
1000
800
600
400
200
0
1
2
3
4
5
6
7
Deposited Energy [MeV]
148Gd
239Pu
241Am
244Cm
Eion for the calibration = 12 eV

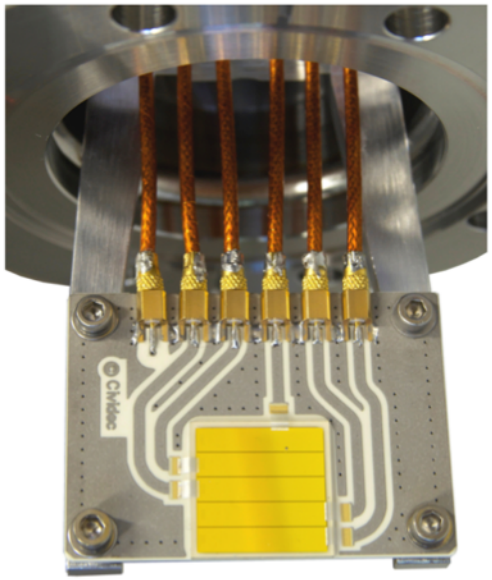
Reference: A. Zimbal, PTB



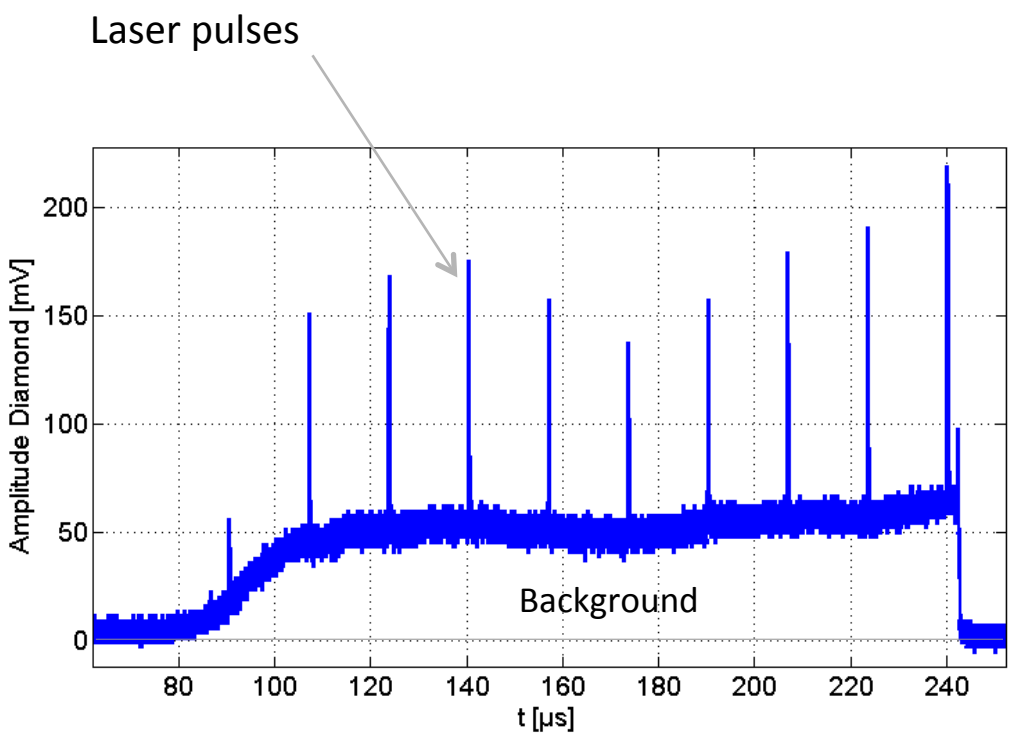
Thomas Hofmann
CERN LINAC4

Emittance Meter



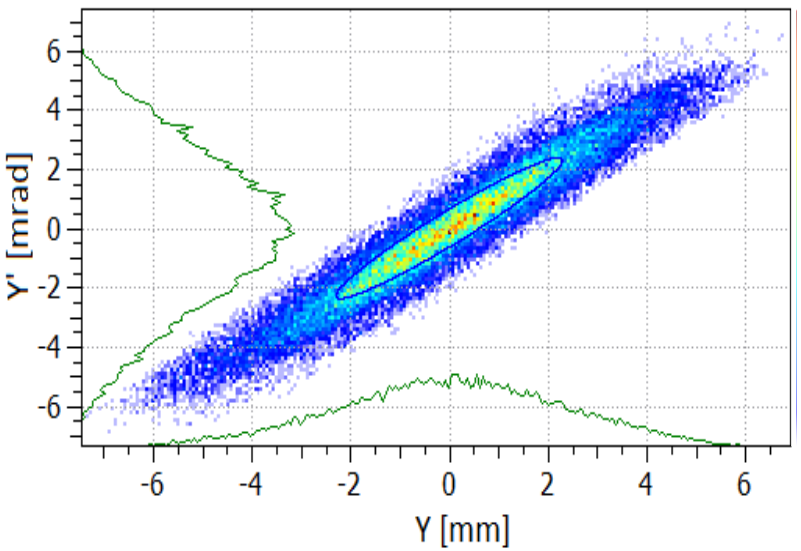


Signal

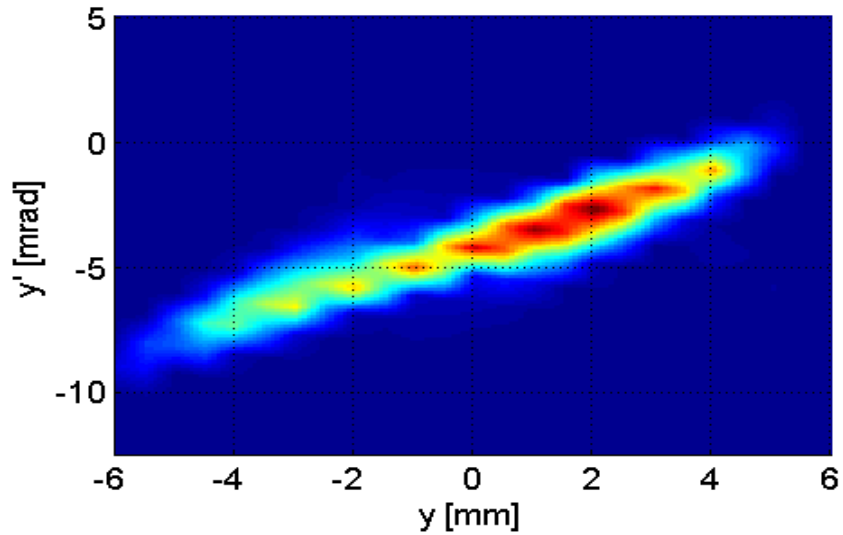

Laser pulses
Amplitude Diamond [mV]
200
150
100
50
0
80
100
120
140
160
180
200
220
240
t [μs]
Background

Emittance

Simulation



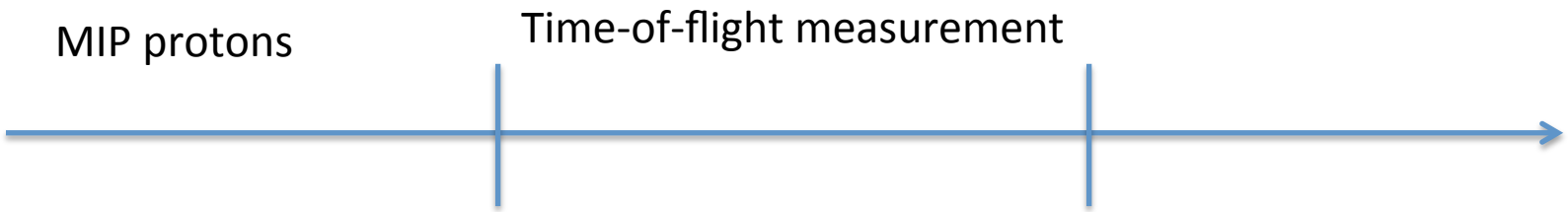
Measurement

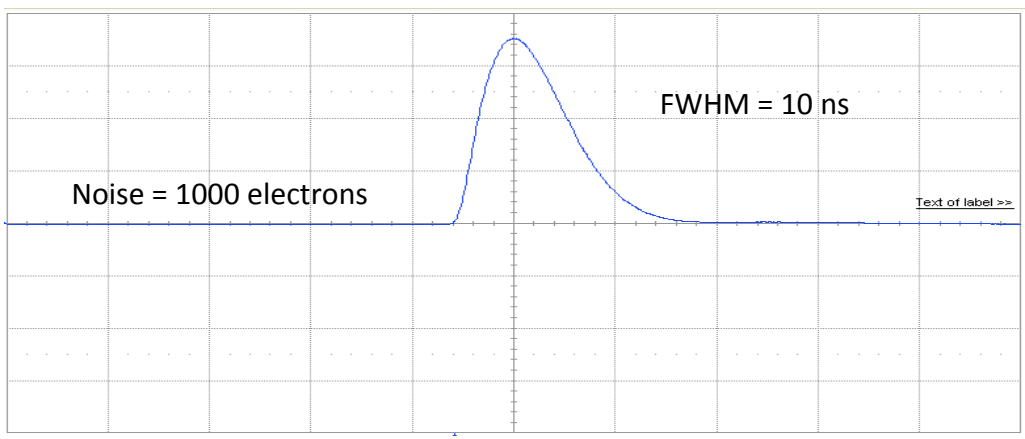


Nicola Minafra

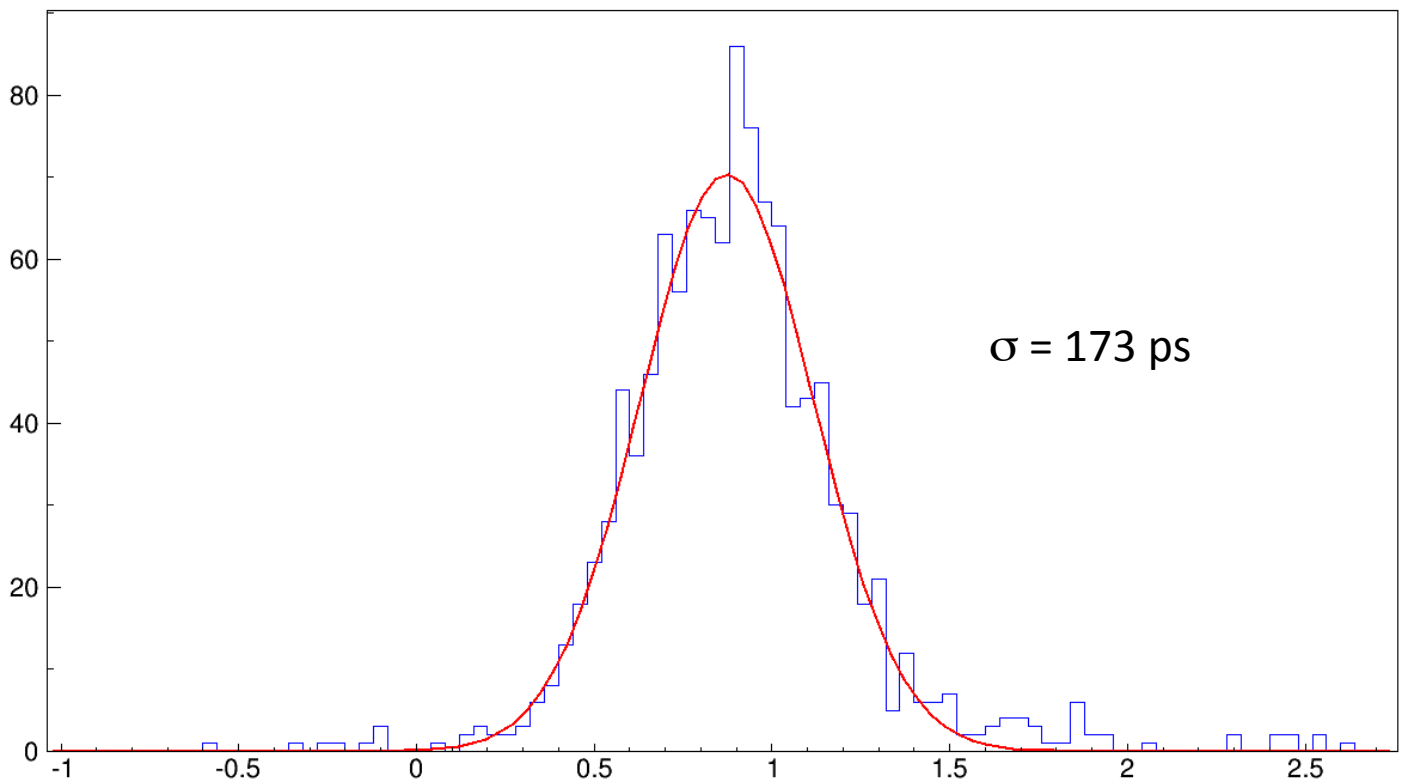
CERN Totem

Time resolution



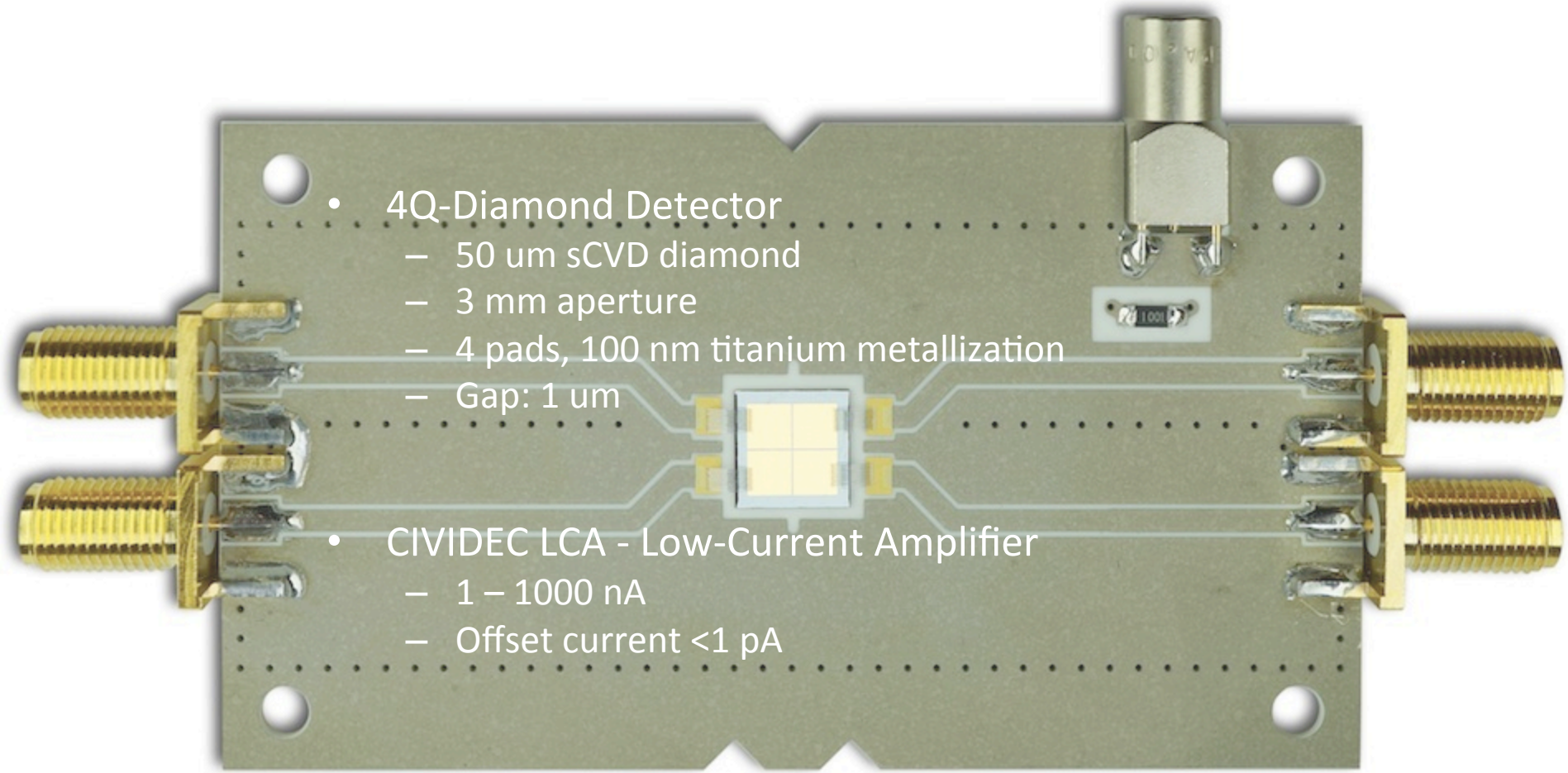


130 MeV pions



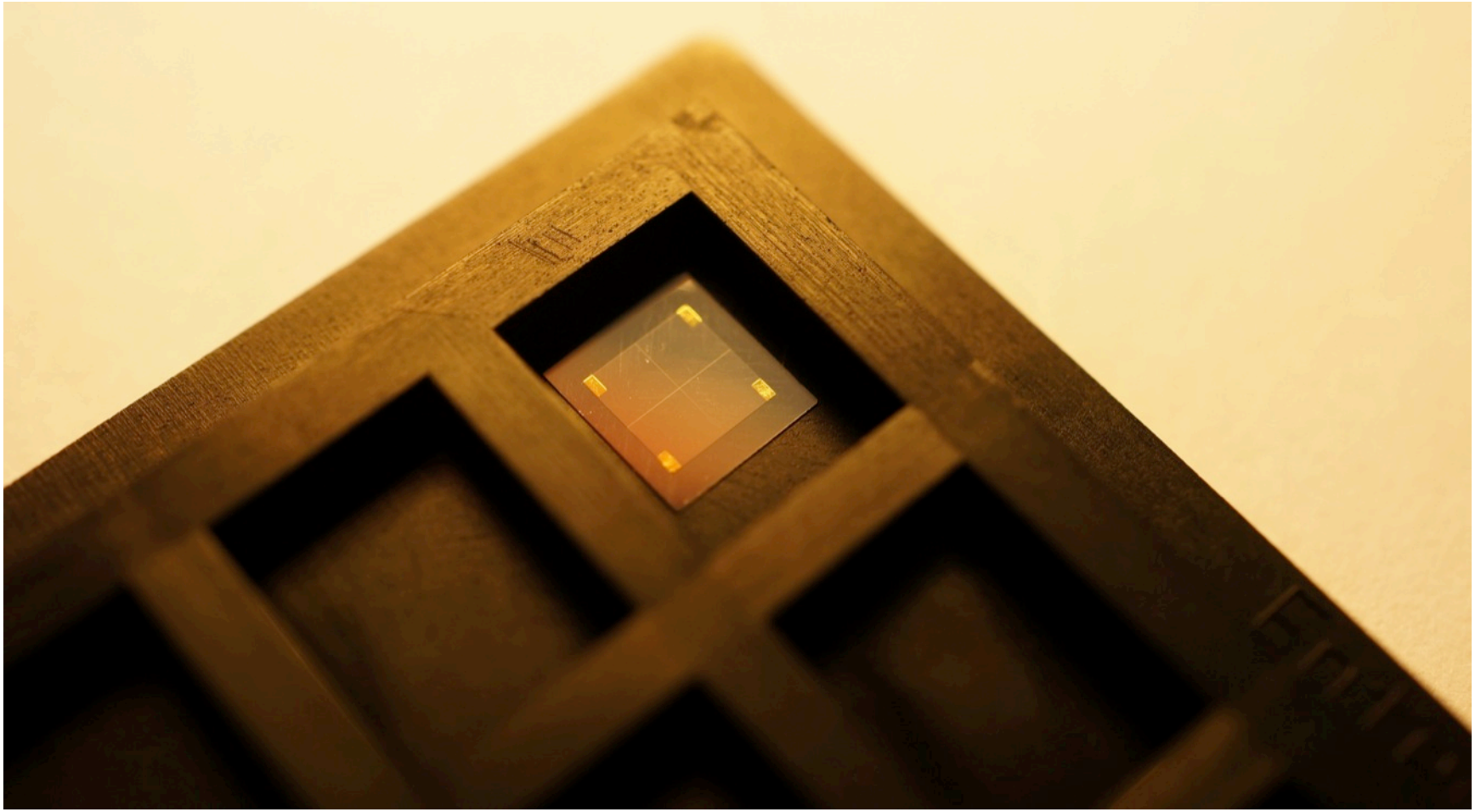
Diamond XBPM
In cooperation with Diamond Light Source

XBPM



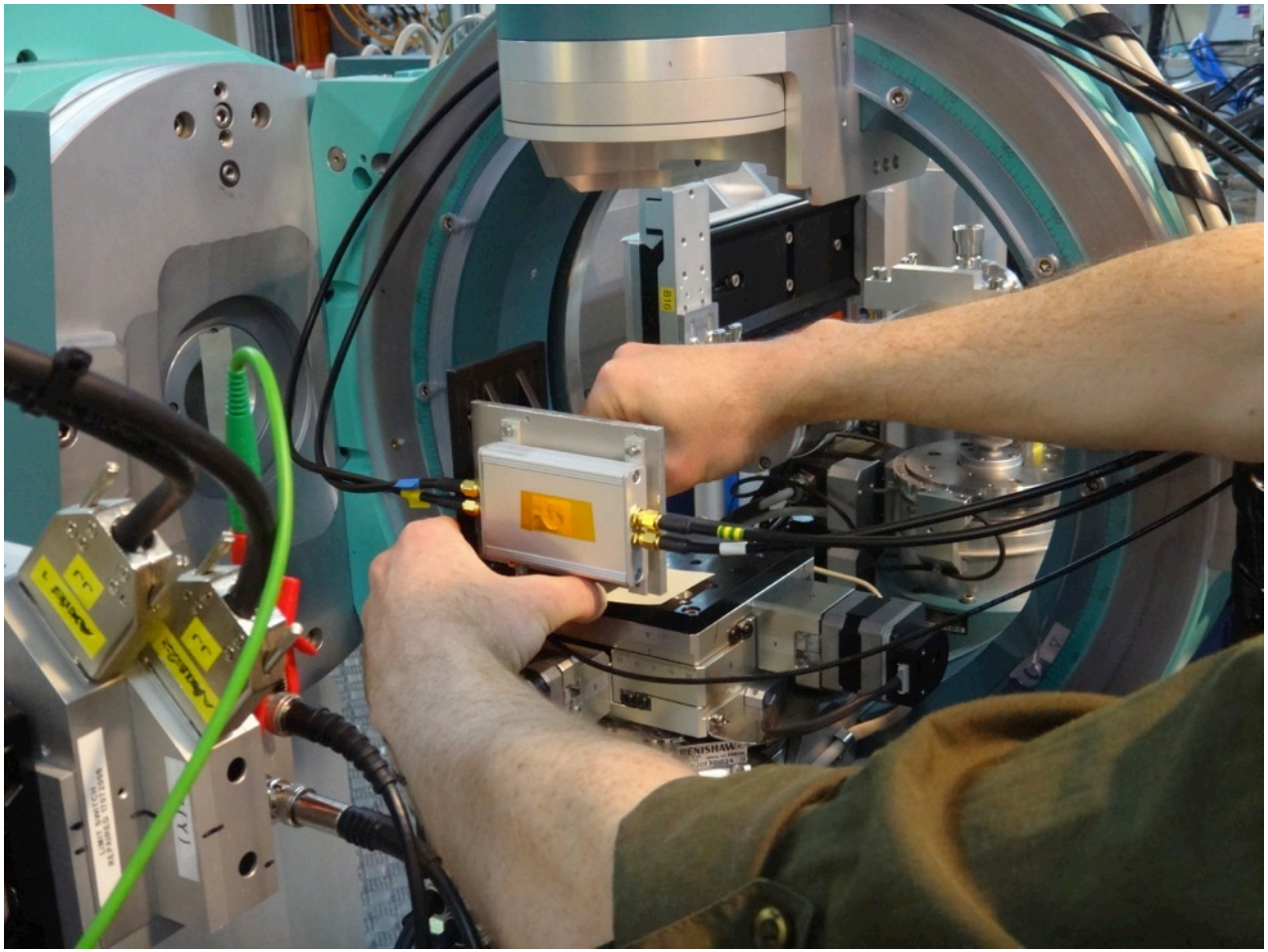
- 4Q-Diamond Detector
  - 50 um sCVD diamond
  - 3 mm aperture
  - 4 pads, 100 nm titanium metallization
  - Gap: 1 um
- CIVIDEC LCA - Low-Current Amplifier
  - 1 – 1000 nA
  - Offset current <1 pA

The 4Q-Diode

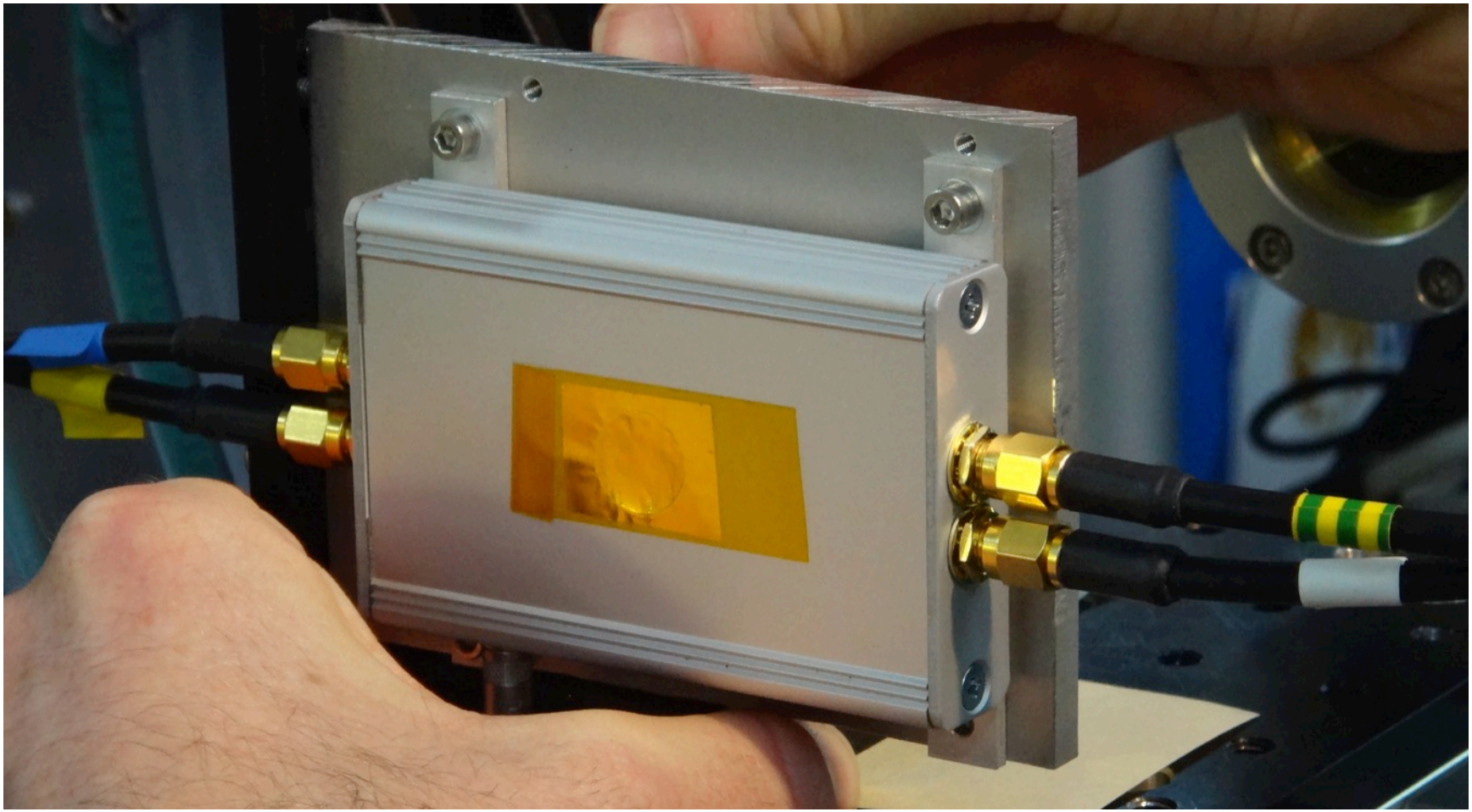


Chris Bloomer, Diamond Light Source

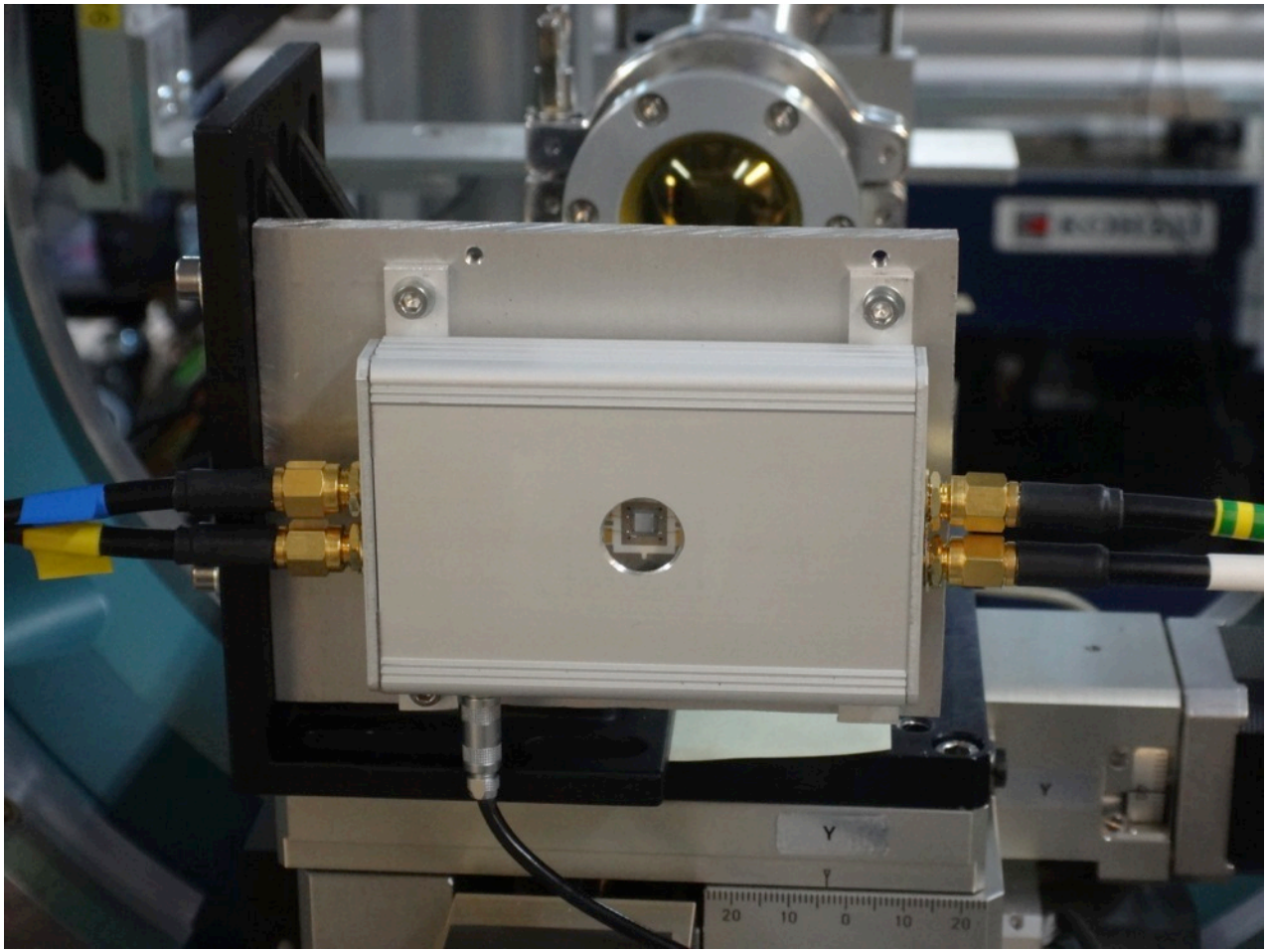
Installation of XBPM



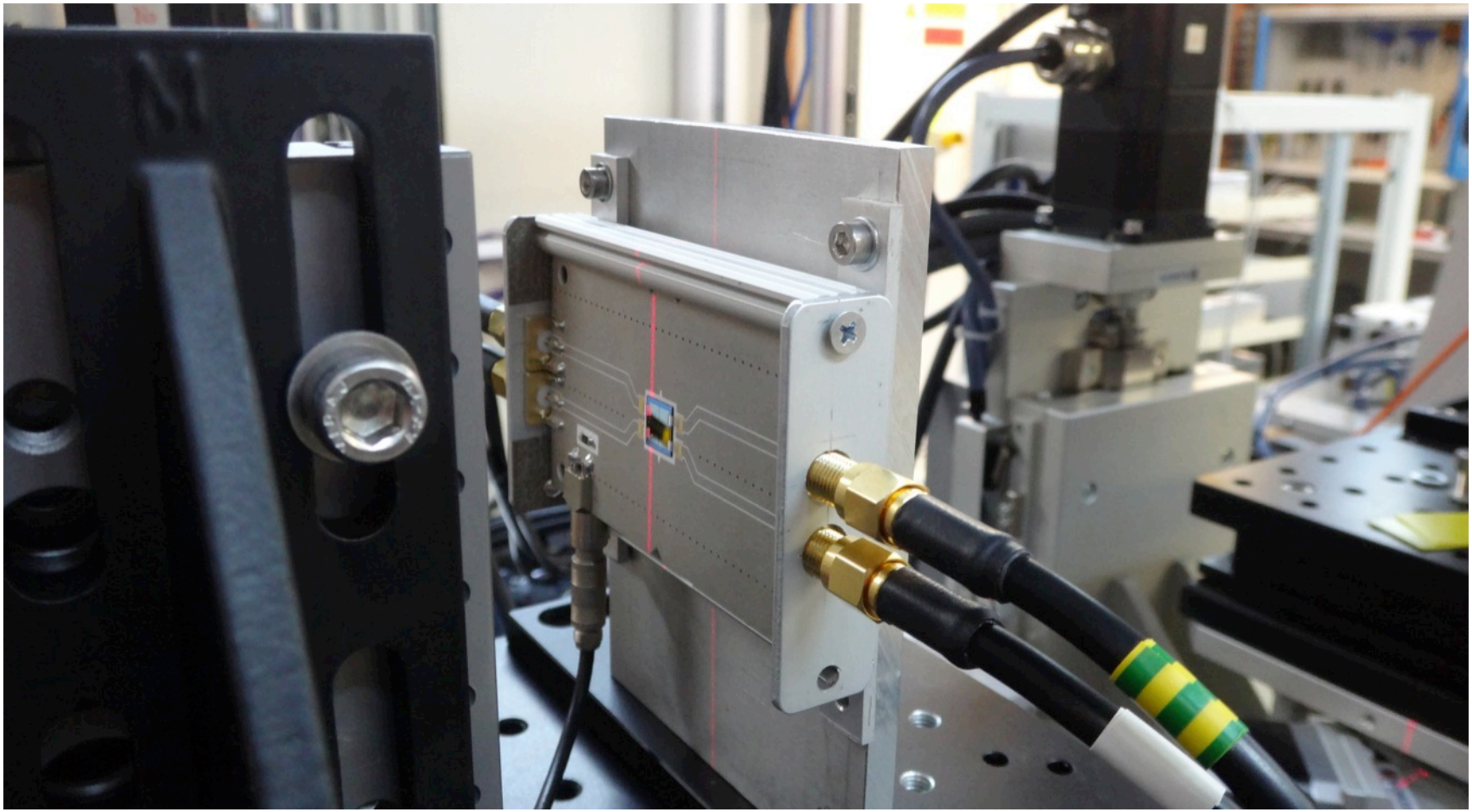
Installation of XBPM



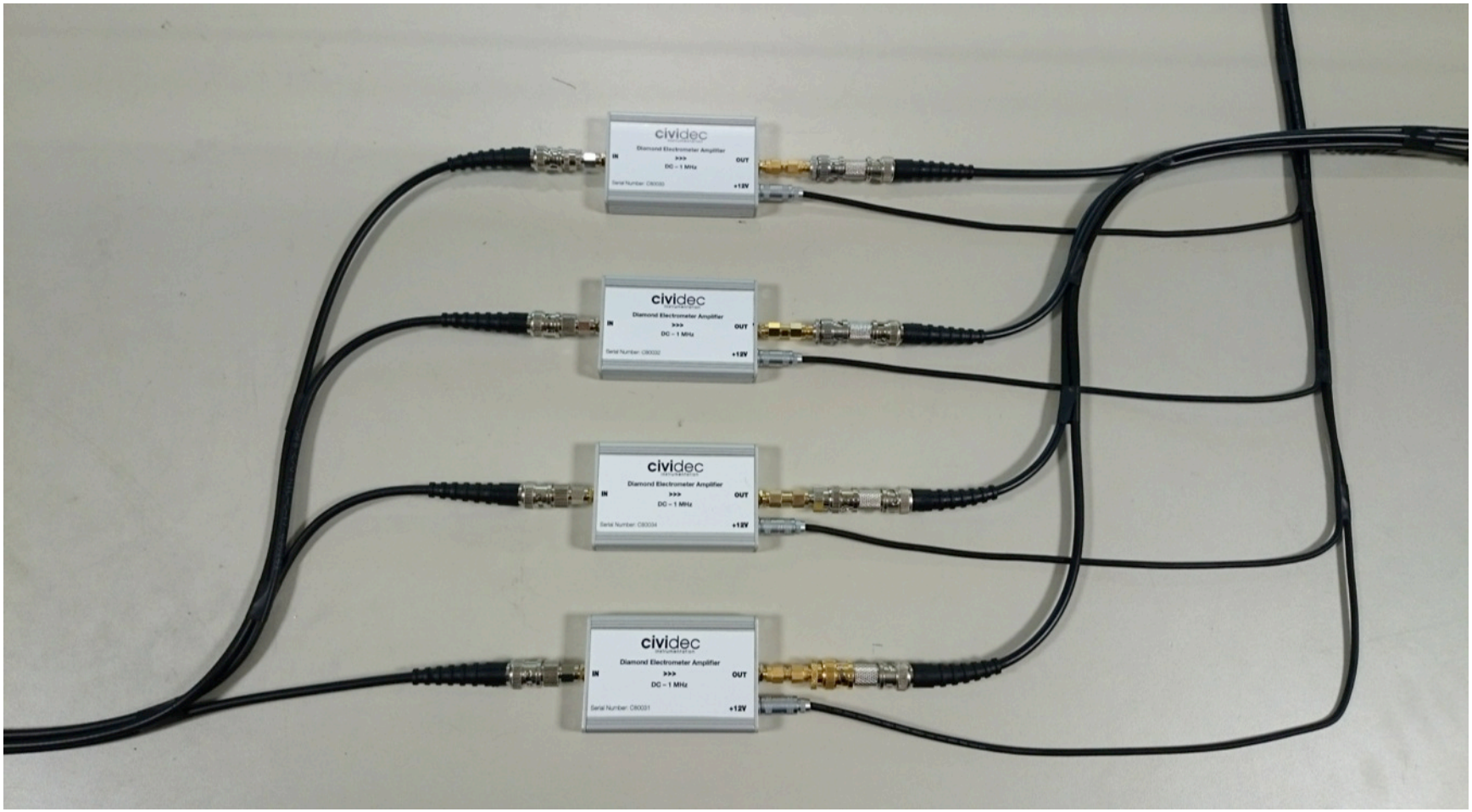
XBPM at the Diamond Light Source



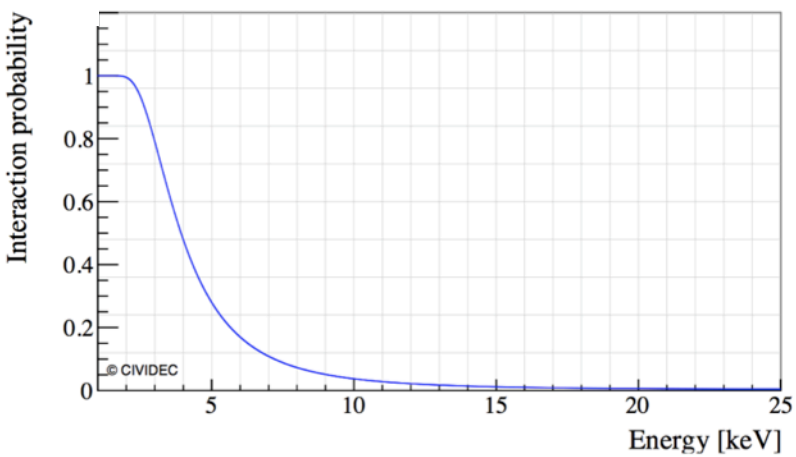
XBPM

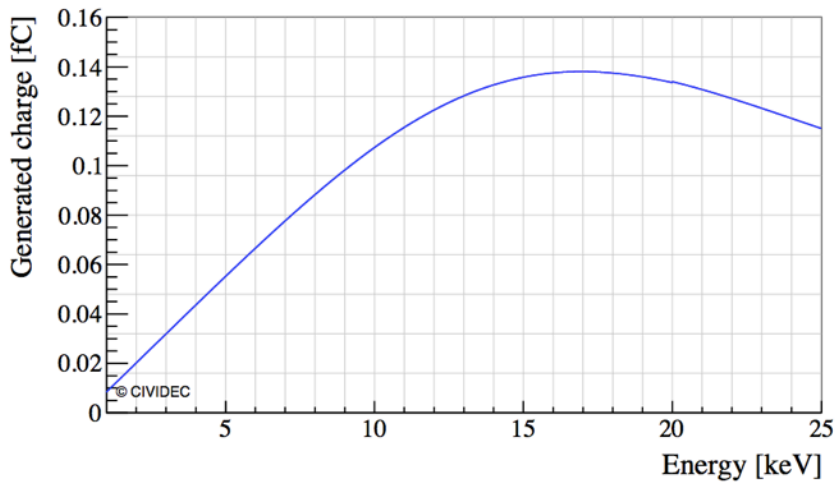


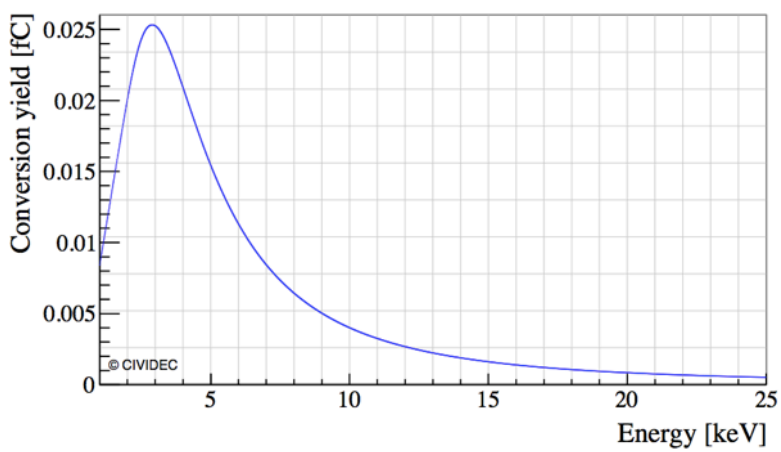
Low-current amplifier

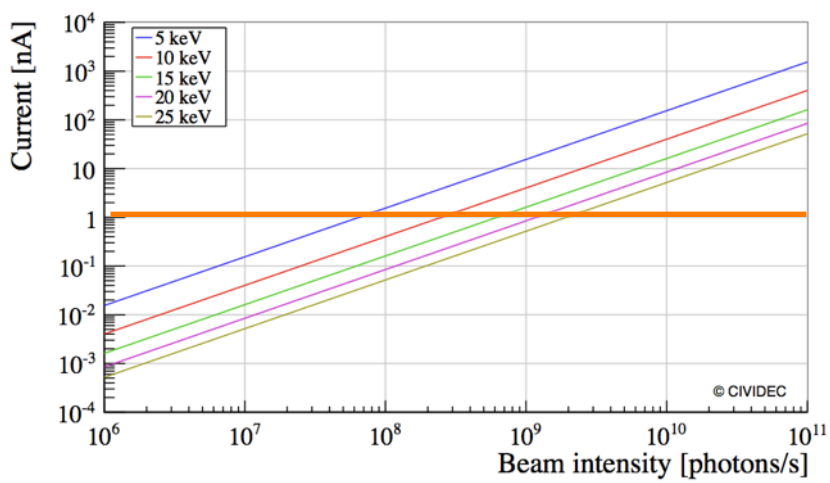


Detector response



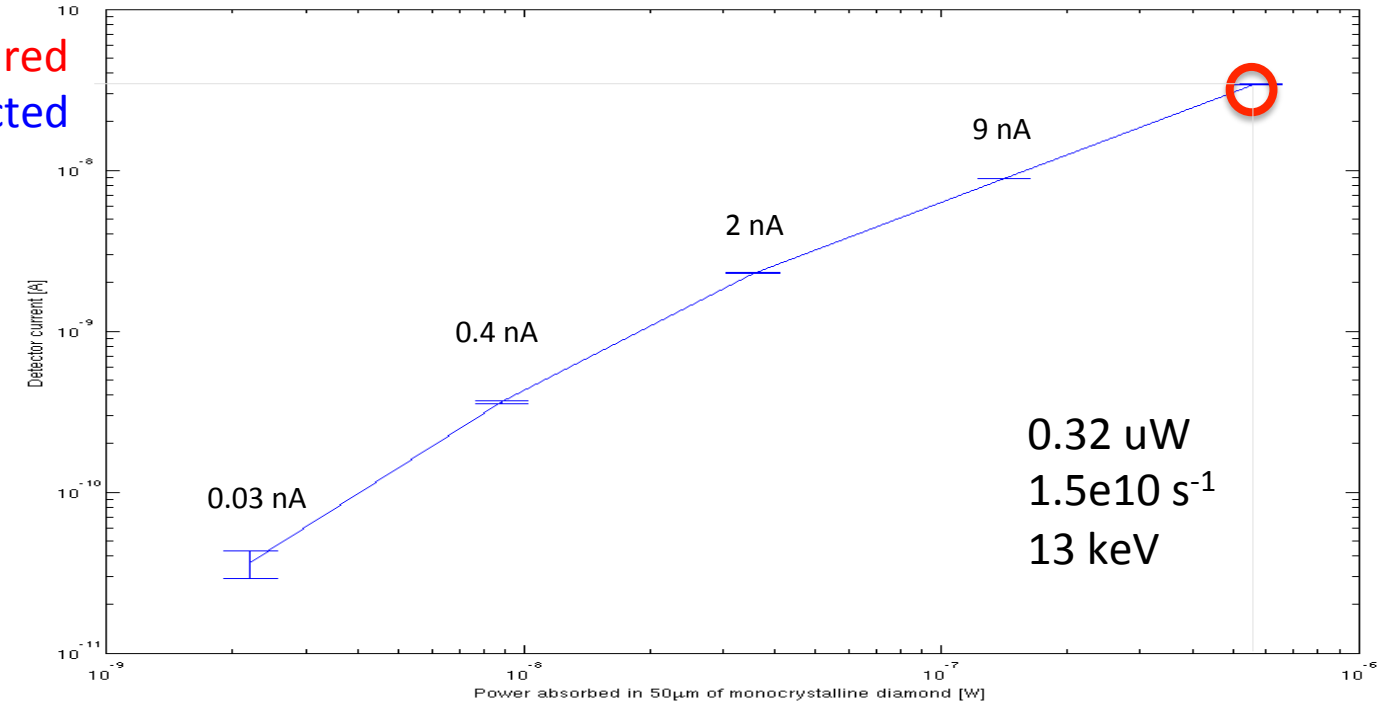




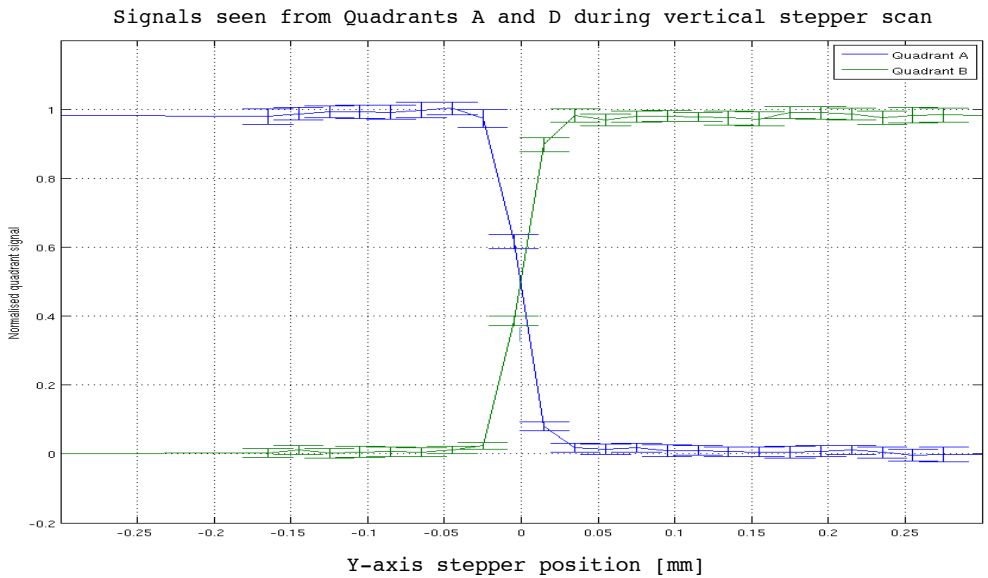


Detector response

33 nA measured
36 nA predicted



Position resolution



$$dl = \frac{noise}{amplitude} \cdot (beam \otimes gap)$$

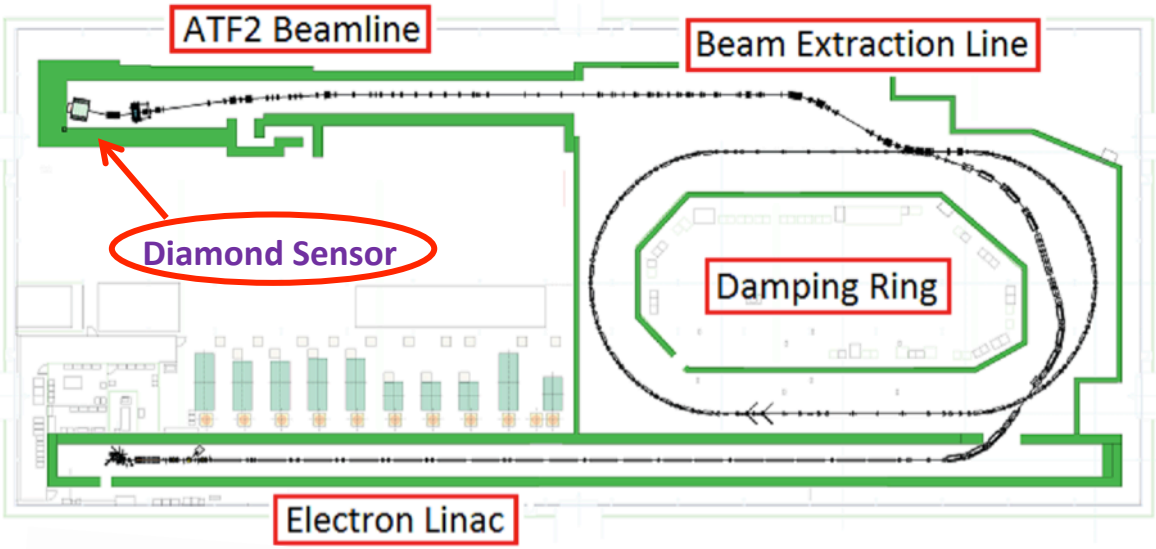
Aim: < 100 nm

Philip Bambade
IN2P3/CNRS et Université Paris Sud

Accelerator Test Facility (ATF) @ KEK

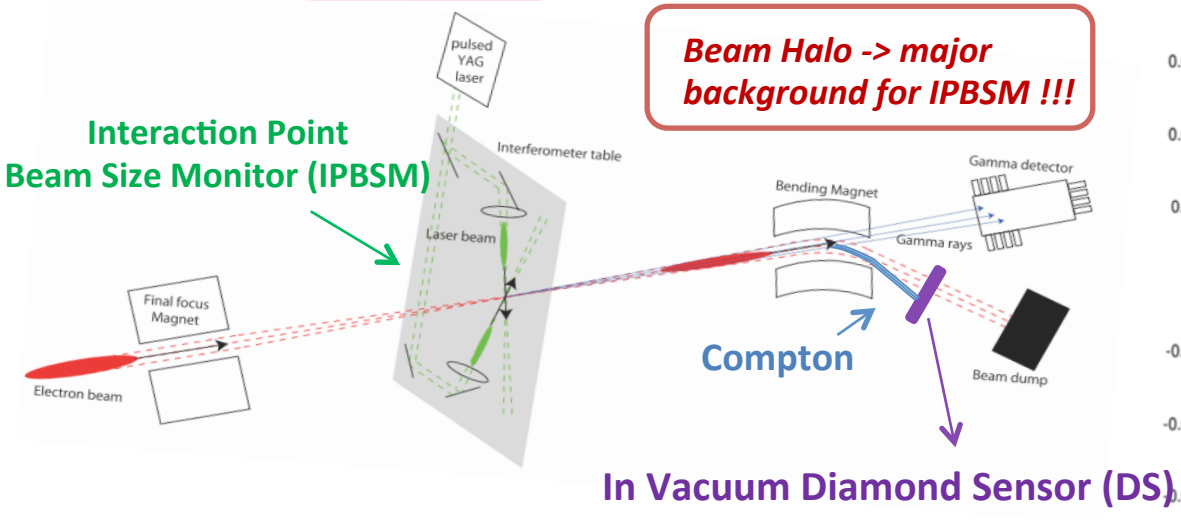
S. LIU, P. BAMBADE et al., LAL-CNRS/IN2P3

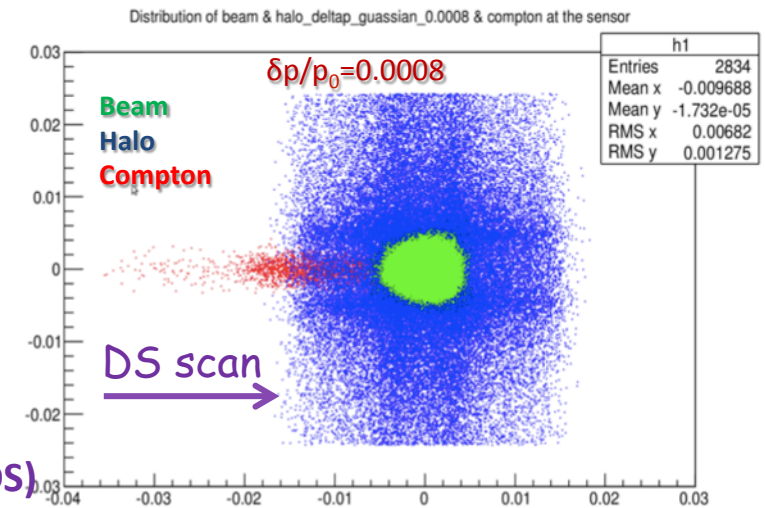
low energy (1.3GeV) prototype of the final focus system for **ILC** and **CLIC**



Goals of ATF2

- *goal 1—achieving the 37 nm design vertical beam size at the IP;*
- *goal 2—stabilizing the beam at that point at the nanometer level;*

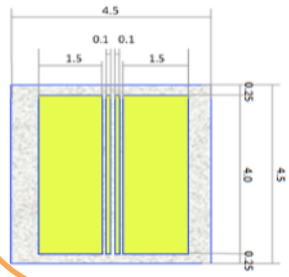


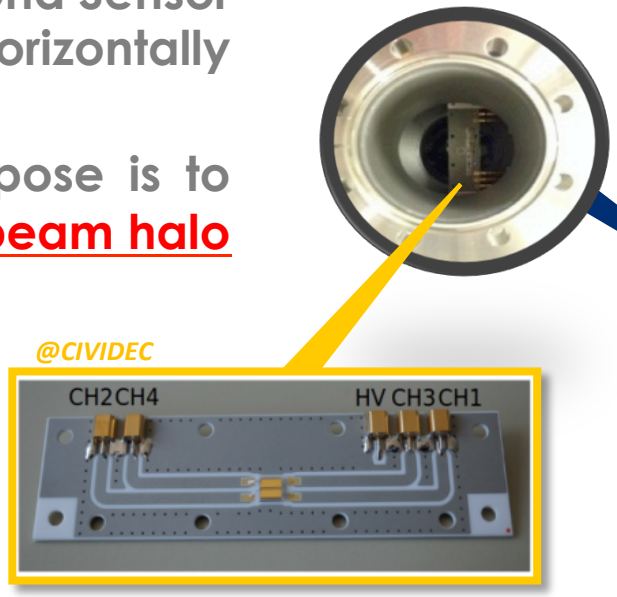


- *Scan beam halo transverse distribution → investigate & control ATF2 beam halo*
- *Probe Compton recoil electron→ investigate the higher order contributions to the Compton process*

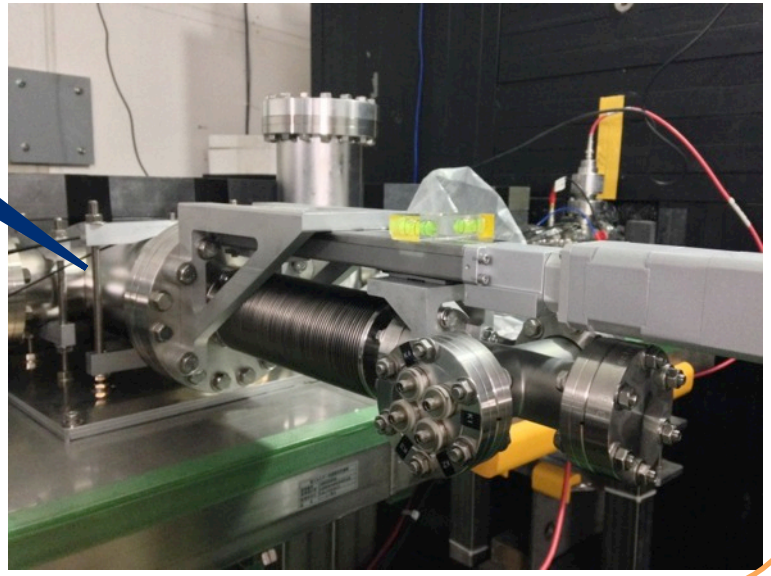
The first Diamond Sensor is installed horizontally at ATF2.

The main purpose is to **measure the beam halo distribution.**

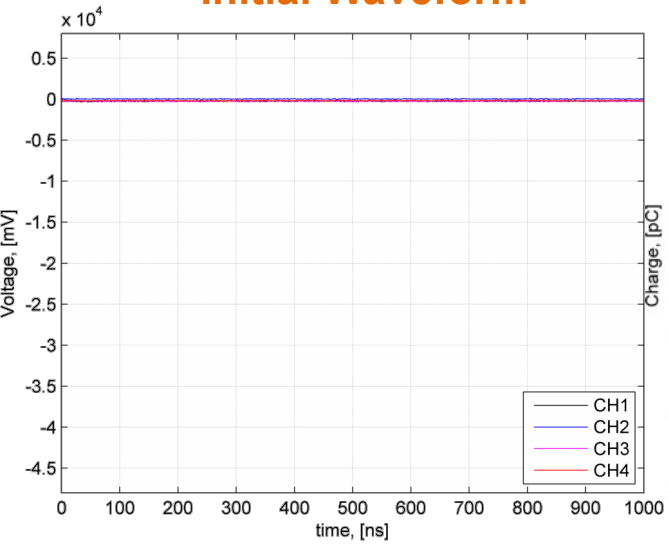




Installed at ATF2 in Nov. 2014

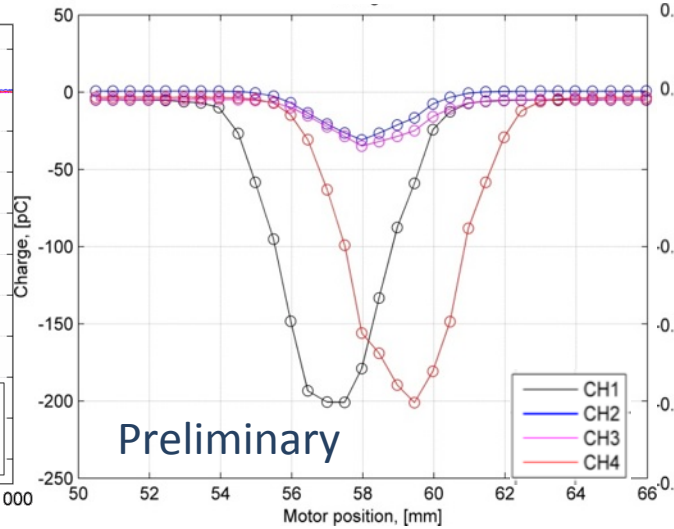


Initial Waveform



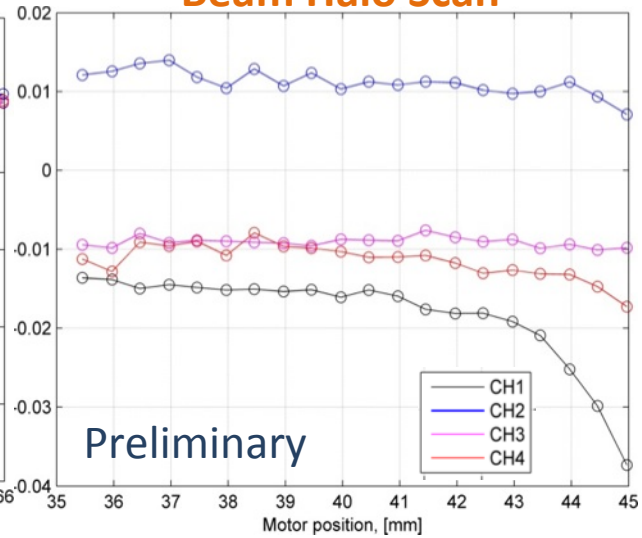
Total Beam intensity: $1.2*10^9$
Voltage on DS: -40V

Beam Core Scan



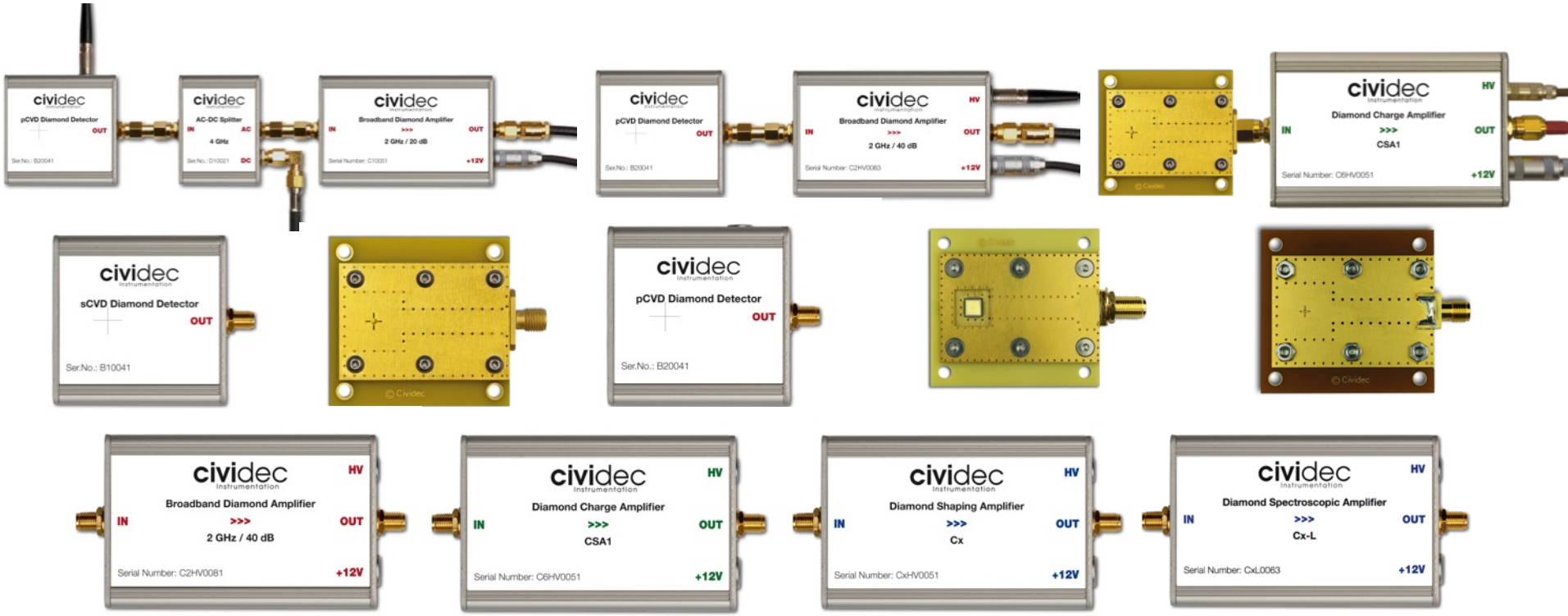
Total Beam intensity: $1.2*10^9$
Voltage on DS: -40V

Beam Halo Scan



Total Beam intensity: $5.2*10^9$
Voltage on DS: -400V

Products


cividec
pCVD Diamond Detector
OUT
Ser.No.: B20041
cividec
AC-DC Splitter
IN
AC
4 GHz
DC
cividec
Broadband Diamond Amplifier
IN
>>>
OUT
2 GHz / 20 dB
+12V
cividec
pCVD Diamond Detector
OUT
Ser.No.: B20041
cividec
Broadband Diamond Amplifier
HV
IN
>>>
OUT
2 GHz / 40 dB
Serial Number: C2HV0083
+12V
cividec
Diamond Charge Amplifier
HV
IN
>>>
OUT
CSA1
Serial Number: C6HV0051
+12V
cividec
sCVD Diamond Detector
OUT
Ser.No.: B10041
cividec
pCVD Diamond Detector
OUT
Ser.No.: B20041
cividec
Broadband Diamond Amplifier
HV
IN
>>>
OUT
2 GHz / 40 dB
Serial Number: C2HV0081
+12V
cividec
Diamond Charge Amplifier
HV
IN
>>>
OUT
CSA1
Serial Number: C6HV0051
+12V
cividec
Diamond Shaping Amplifier
HV
IN
>>>
OUT
Cx
Serial Number: CxHV0051
+12V
cividec
Diamond Spectroscopic Amplifier
HV
IN
>>>
OUT
Cx-L
Serial Number: CxL0063
+12V


AX106
cividec
Instrumentation
COM1
VGA
LAN1
LAN2
USB
FC
CH1
CH2
CH3
CH4
TRIG
OUT
Diamond Readout System
ROSY

cividec Instrumentation

Thank you for your attention !