… riding the wave

Development of new measurement capabilities at Kyma

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Presentation of Kyma

- **Kyma Srl was formally established on August 28th 2007**
  - ***Specific purpose was to realize the undulators for the FERMI@Elettra Project***
- **All the 18 undulators delivered by June 2011**
- **"External" market entered in 2010**
- **By current date Kyma made more than 50 undulators and 60 phase shifters**
  - ***Most of the undulators are EPUs***
  - ***Some unique projects for INFN, Cornell***

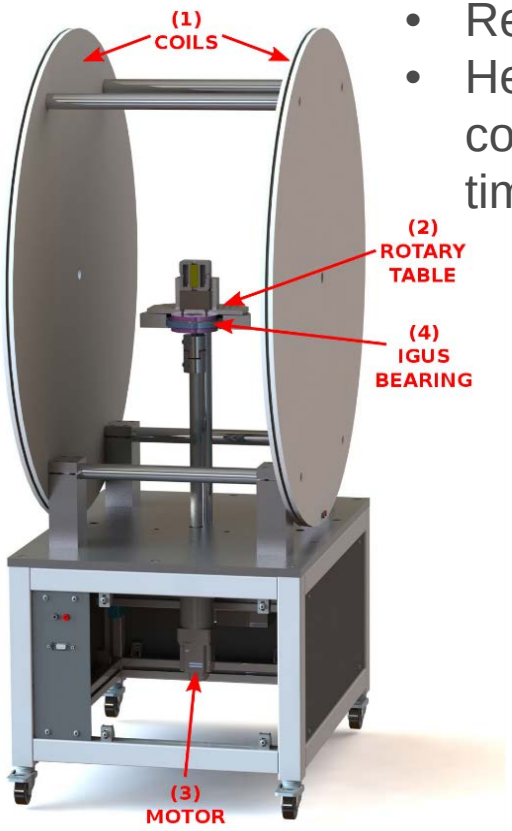
Kyma is an industrial company specialized in insertion devices

Developments in magnetic measurements

- Helmholtz coil improvement
- Measurement bench for CCU
- New 3D hall probe from Senis – Type C
- Universal bench CS
- Pulsed wire from CSU

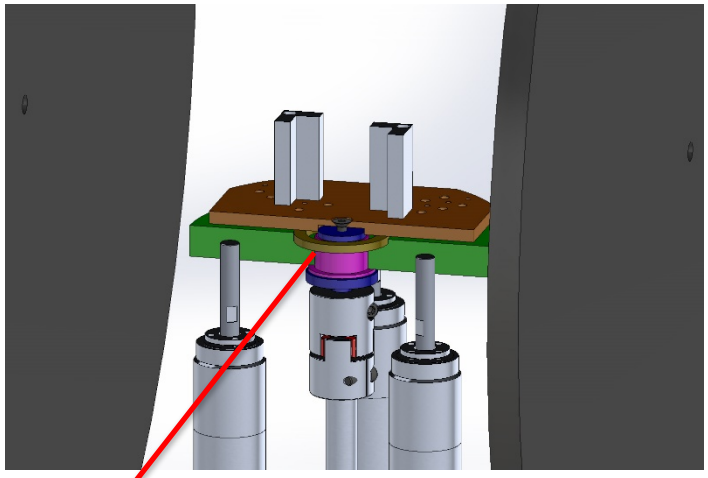
Improved Helmholtz coil

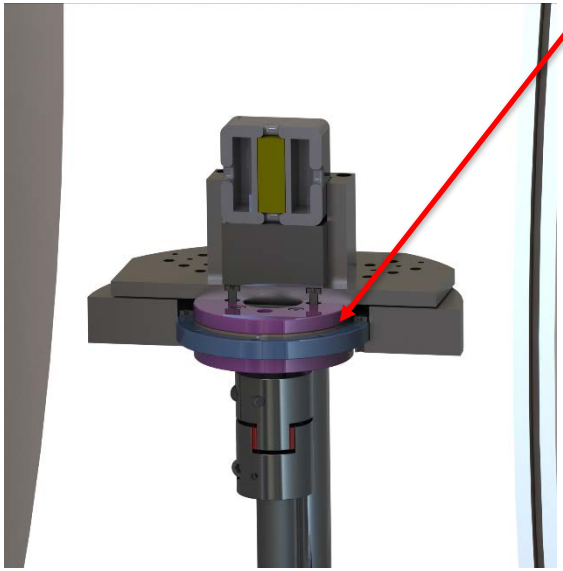
Helmholtz coil for industrial quantities



Old system

- PTFE friction bearing
- Radial only
- Requires maintenance
- Heated when used continuously for long time





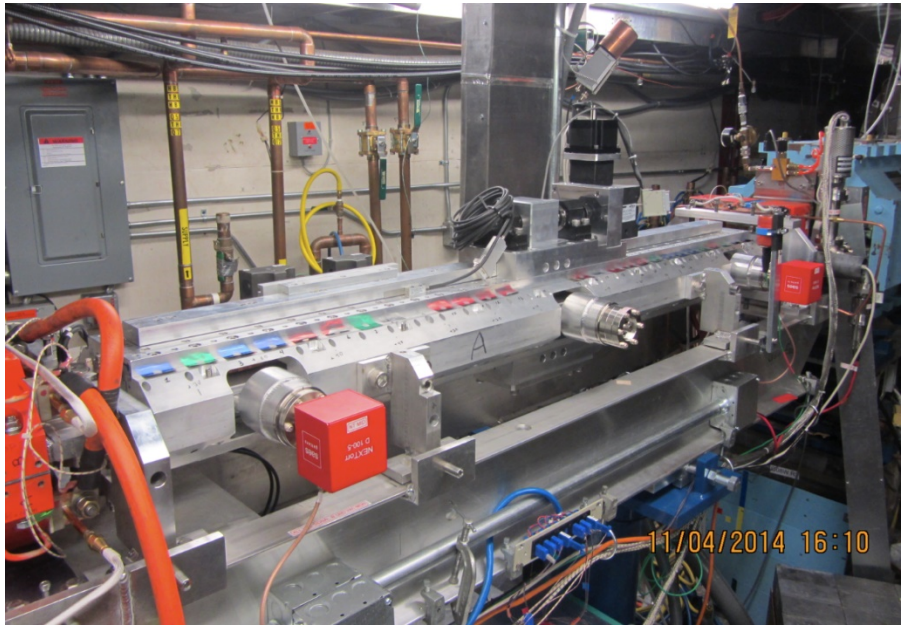
New system

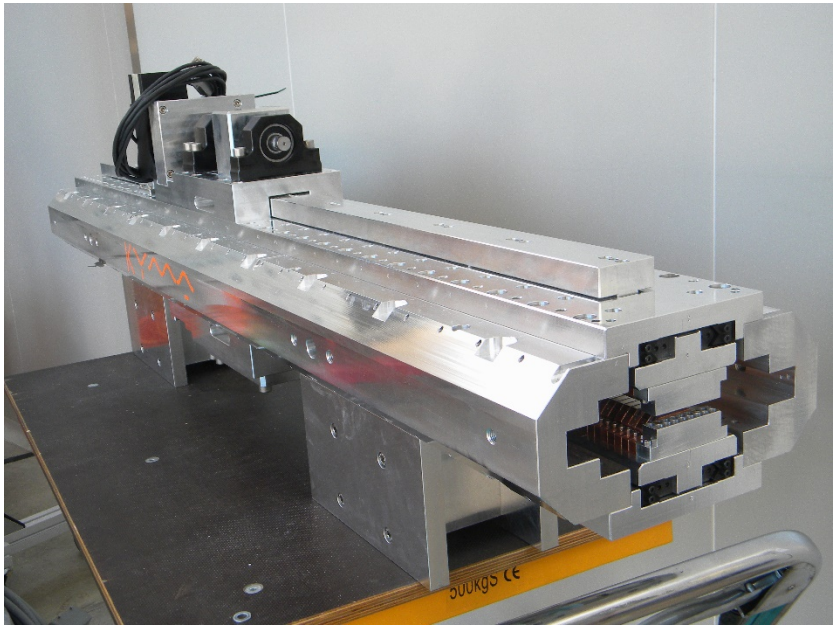
- IGUS PTR bearing
- Axial and radial bearing
- Non magnetic
- No maintenance
- Long term continuous use

- New stable software

Cornell Compact Undulator

- Closed structure undulator
- Fixed gap device (~ 7 mm gap)
- Field tuning achieved by longitudinal phasing of magnets
- Vacuum compatible





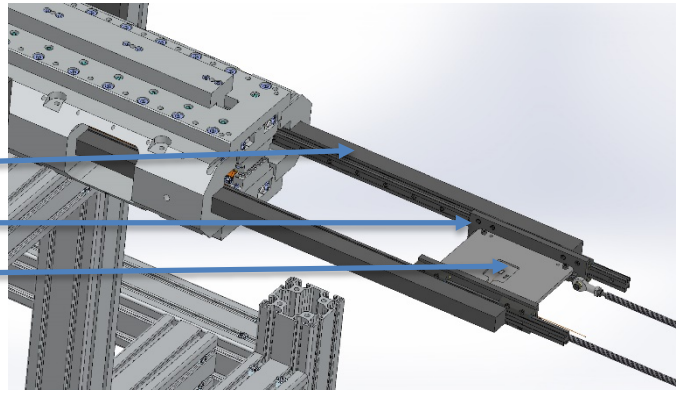
CCU measurement bench

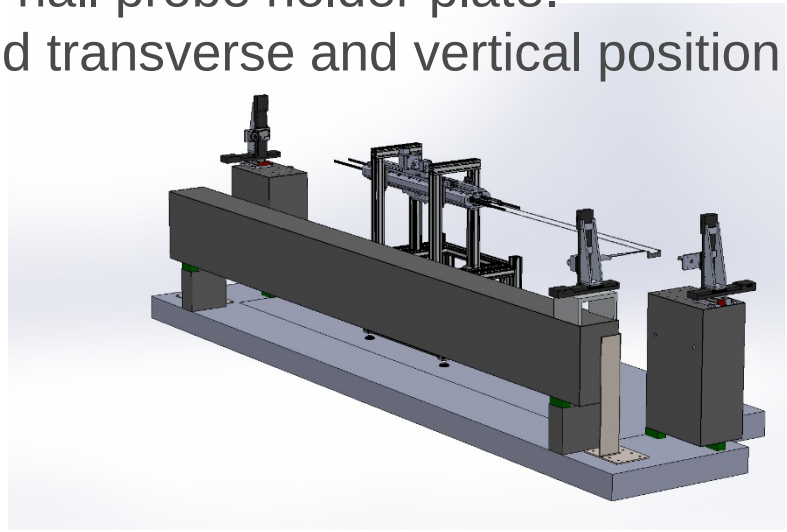
Requirements

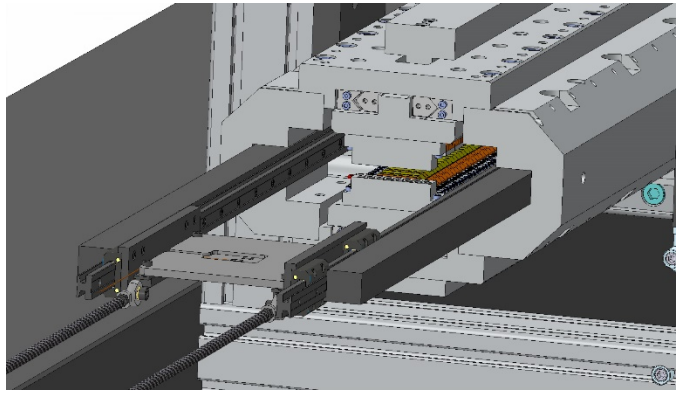
- Measurement of closed structure
- Reuse of the driving mechanism of old measurement bench
- Mechanical position accuracy of 50 um

Solutions

- Aluminum precision machined bars
- IGUS guide rails
- FR4 hall probe holder plate.
- Fixed transverse and vertical position

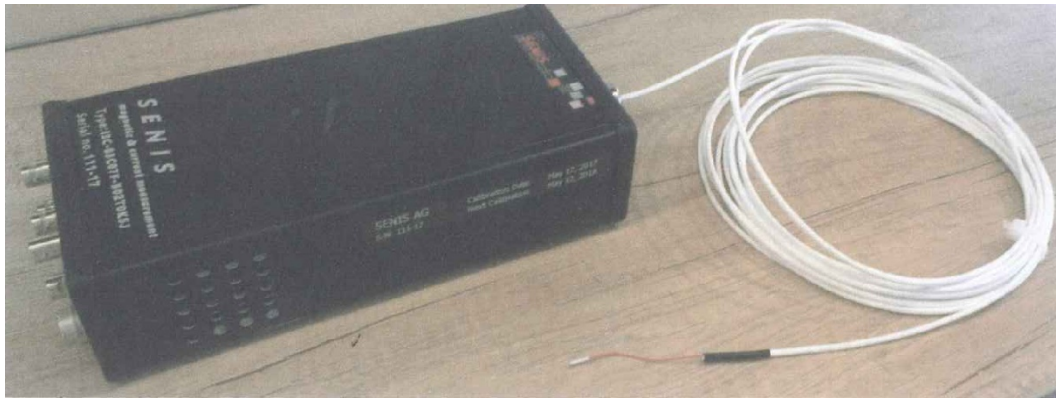


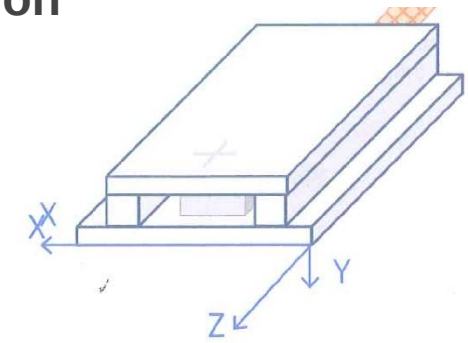


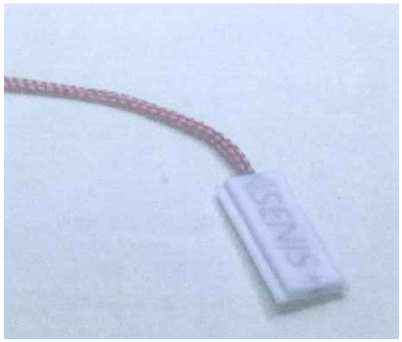


Senis type C probe with I3C transducer

- **I3C-0307F-B02T0K5J**
- **3D probe for point measurements**
- **Small profile probe**
- **Small detector:**
  - ***Y: 30x5x30 um^3***
  - ***X, Z: 100x10x100 um^3***
- **Very good linearity**
- **Low noise and drift**
- **Can be used on measurement system without any modification (hardware or software)**

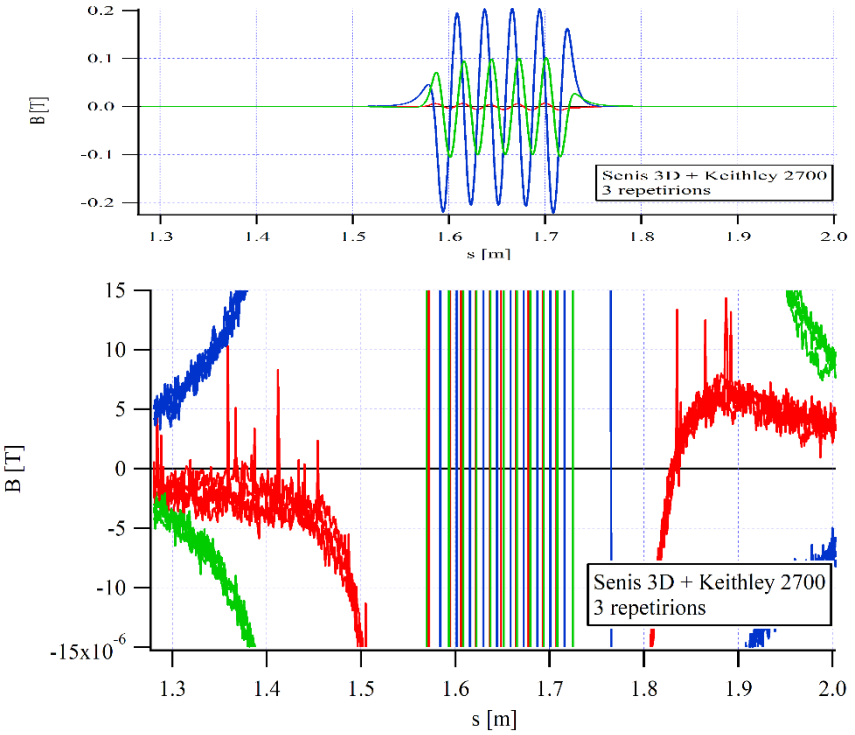




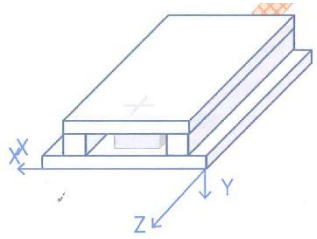


Senis probe – first measurements 1/2

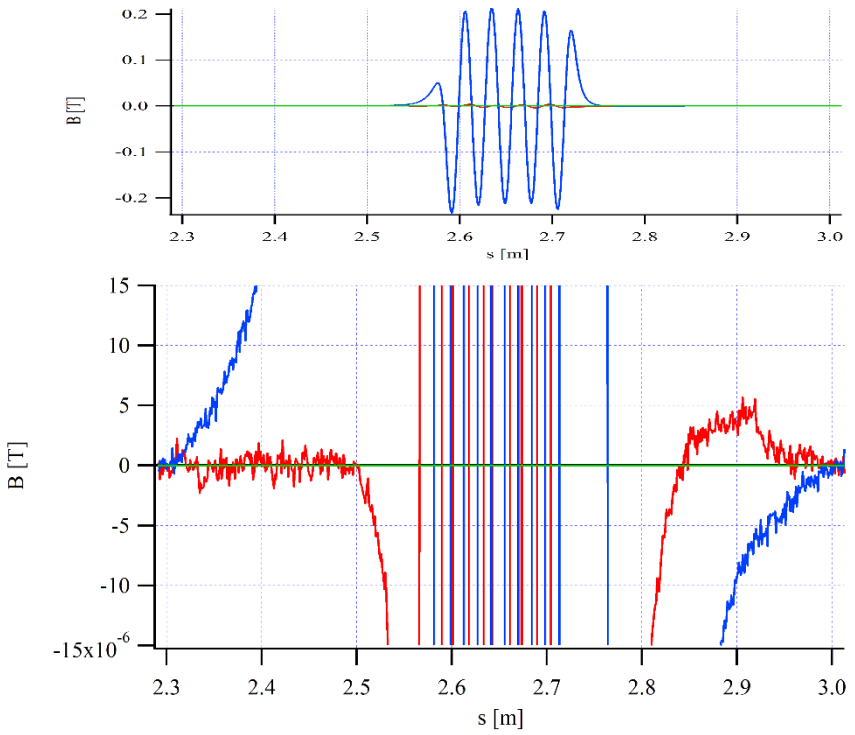
Senis Type C probe



	Std. Dev. [uT]
Bx – Z	1.45
Bz – Y	0.66
Bs – X	0.66



Senis Type I probe



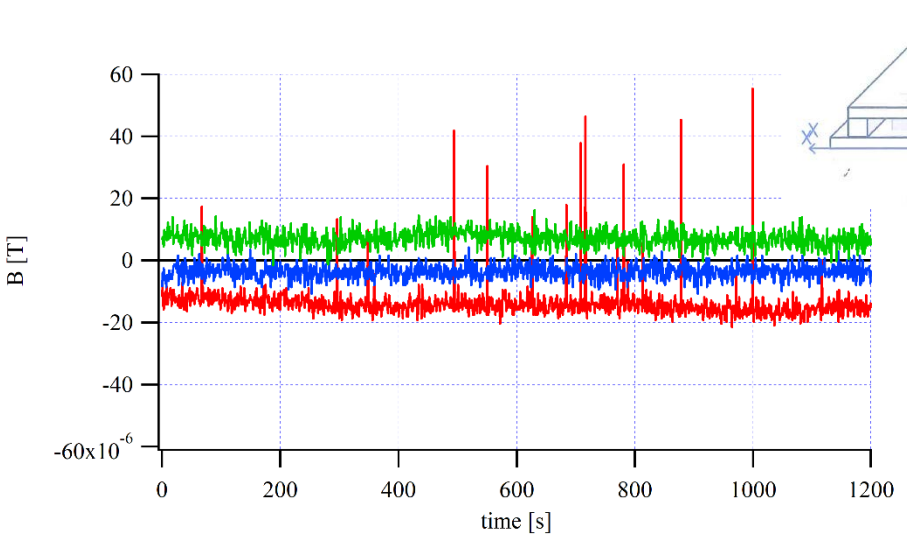
	Std. Dev. [uT]
Bx – Z	0.81
Bz – Y	4.22
Bs – X	NA

Senis probe – first measurements 2/2

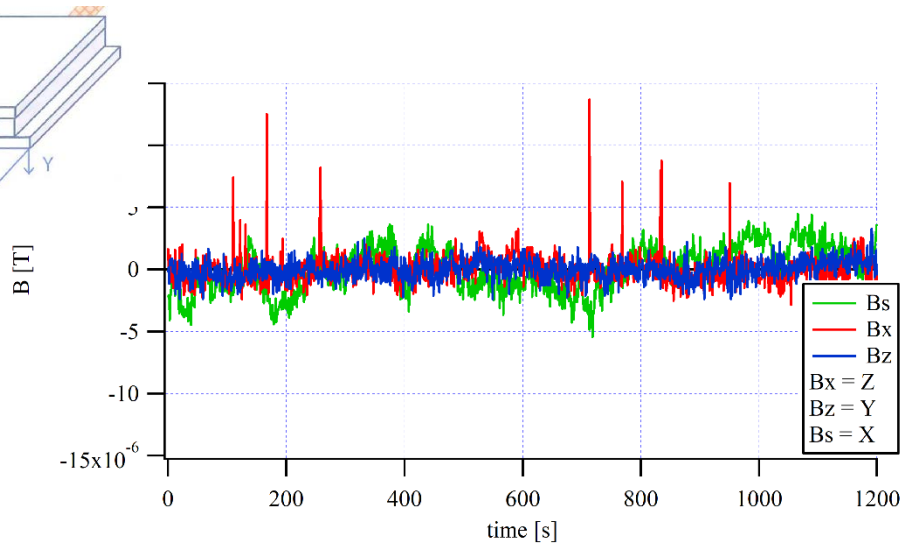
Long term stability and drift for 20 minutes

	Average [uT]	Std. Dev. [uT]
Bx – Z	-14	5.3
Bz – Y	-3.6	2.3
Bs – X	7.1	2.6

	Average [mT]	Std. Dev. [uT]
Bx – Z	3.7	6.2
Bz – Y	0.1	4.3
Bs – X	-2.1	9.0



Keithley 2700 DMM – shorted inputs



Keithley 2700 DMM + Senis type C probe. Average subtracted

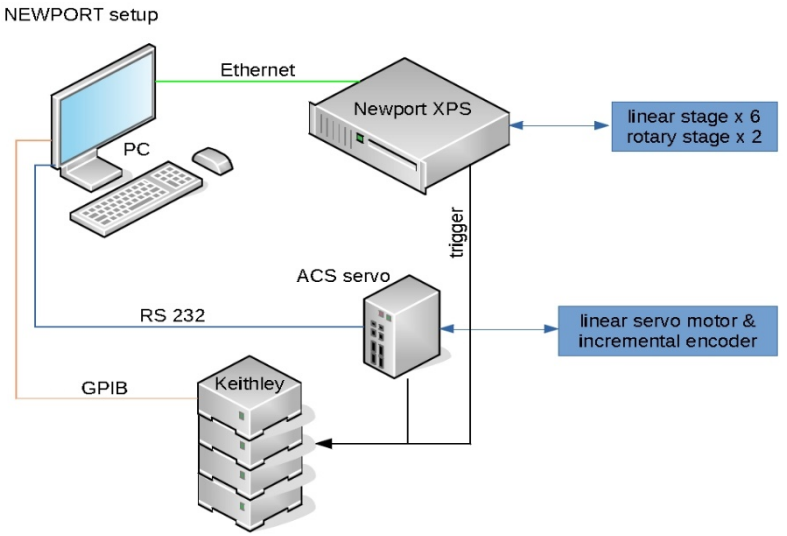
Universal measurement bench CS

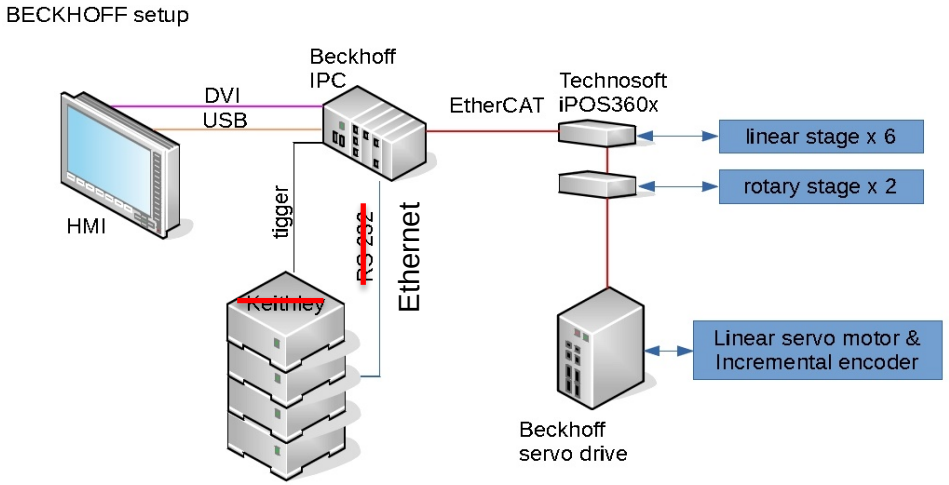
Old ESRF System

- *Newport XPS controller – works only with old version C8*
- *ESRF bench control software – no source code*
- *Igor Pro 6.12 and below*

New Kyma Control System

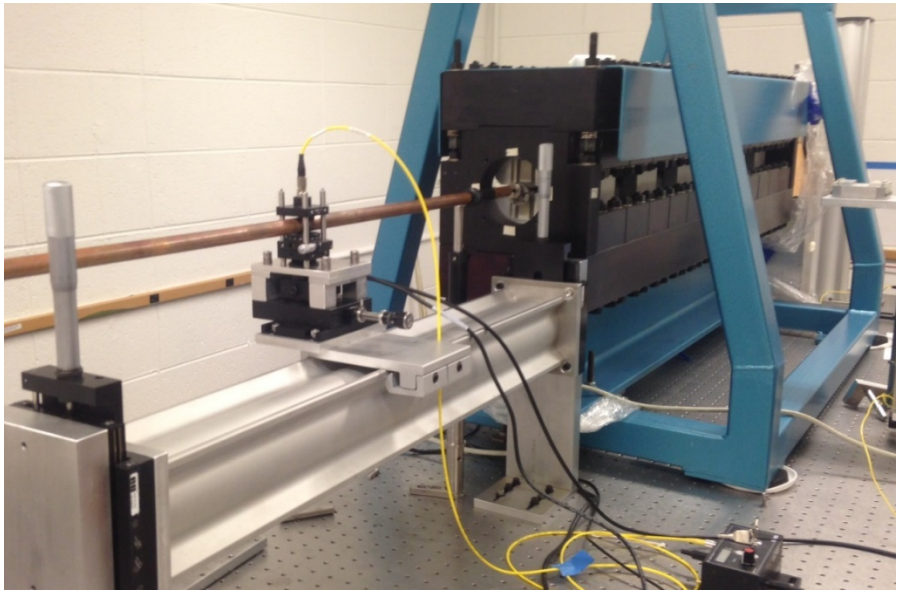
- *Flexible Beckoff motion control*
- *Possibility to use any motion and measurement hardware*
- *Python interface*

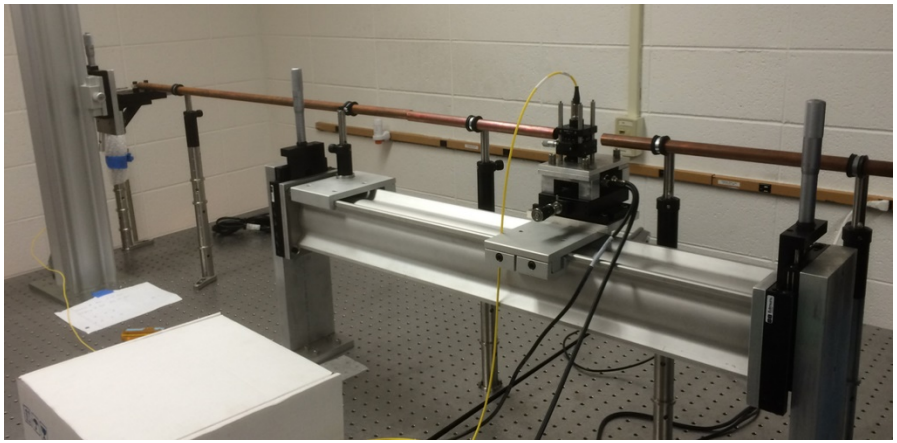




Pulsed wire from CSU

- ***Acquired from Colorado State University***
- ***High resolution measurements of small and closed gap devices.***
- ***Measurement and processing software provided by CSU. Including dispersion correction algorithm.***
- ***Current status***
  - Design of mechanical supports
  - Expected commissioning in fall 2017





Thank you!

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