

LNF – ROMA2 Laboratory Report

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People

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 - Olimpio Giacinti
 - Rossano Sorchetti
- Desy
 - Katja Konkavaara

Outlines

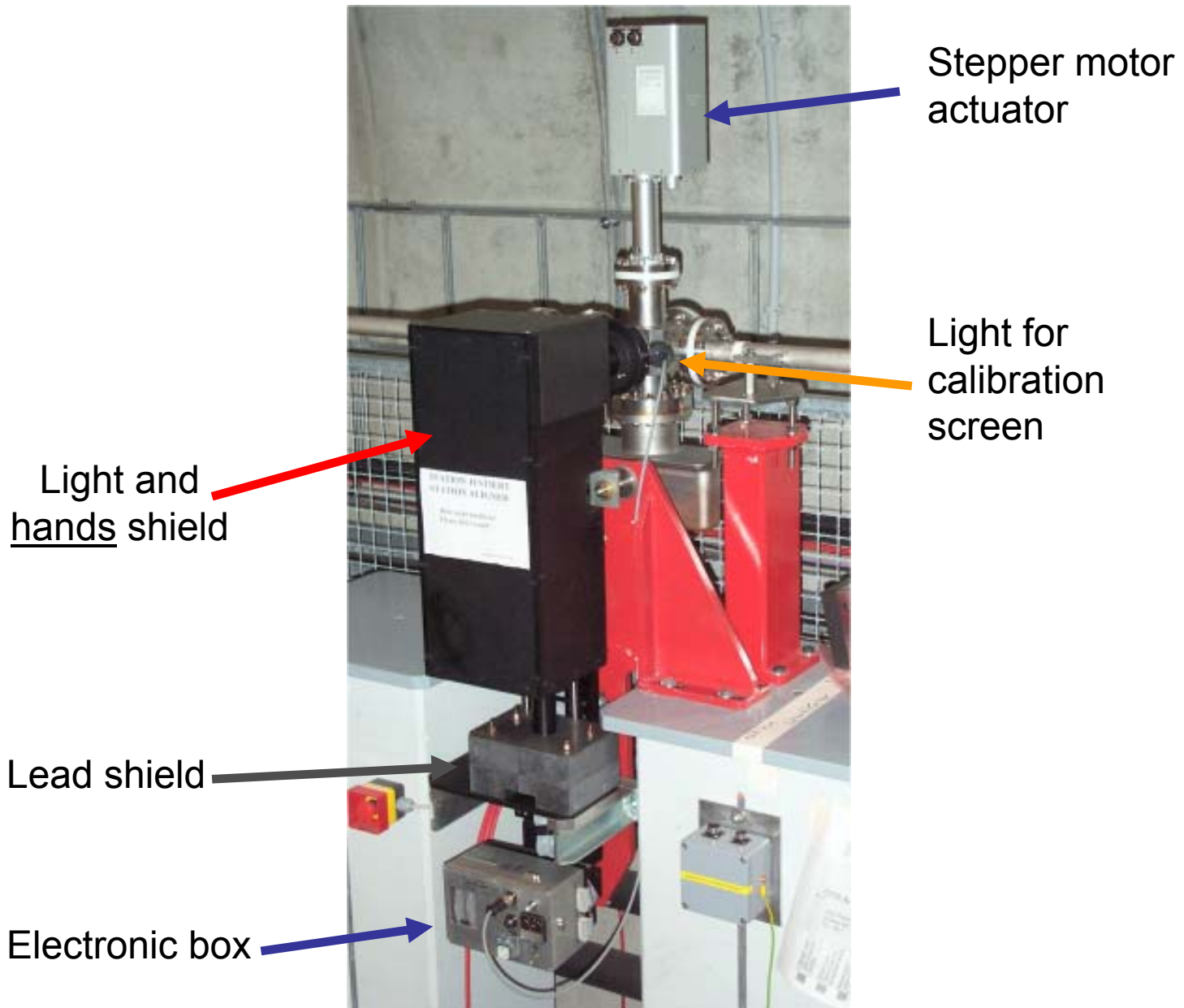
- TTF 2 activities
 - OTR optical system
 - Performances, status of installation
 - Camera control and acquisition system
 - Layout, status of installation
- SPARC activities
 - Emittance-meter
 - Status report

TTF2 OTR Optical System

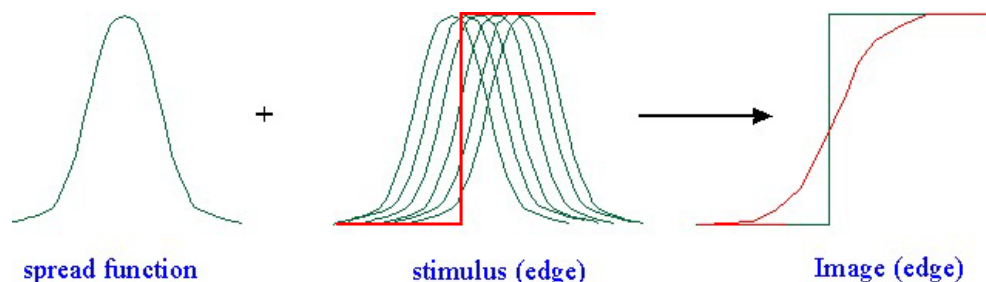
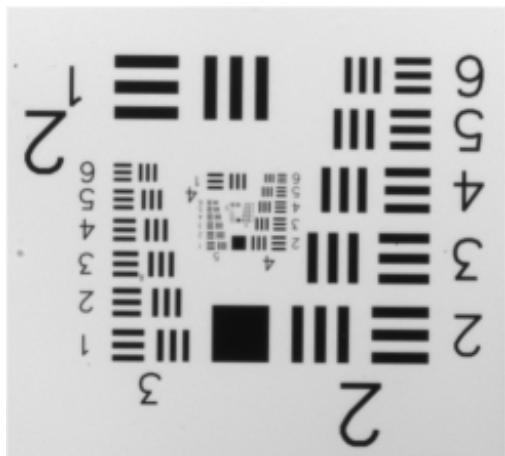


- New design for phase 2
- Flexible
- Remoted controled
- Protected
- Magnificatio 1, .39, .25

System installed



Performance tested in lab



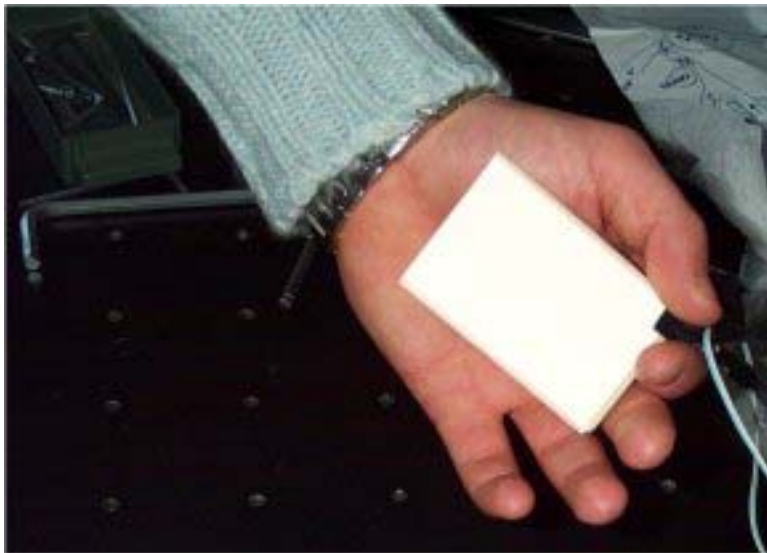
Fit of the LSP with a convolution between a Gaussian and a step function. Result is fully consistent with the Rayleigh criterion applied to the MTF

Average resolution for lens 1 $11,0 \pm 0,4 \mu\text{m}$

Average resolution for lens 2 $27,7 \pm 0,3 \mu\text{m}$

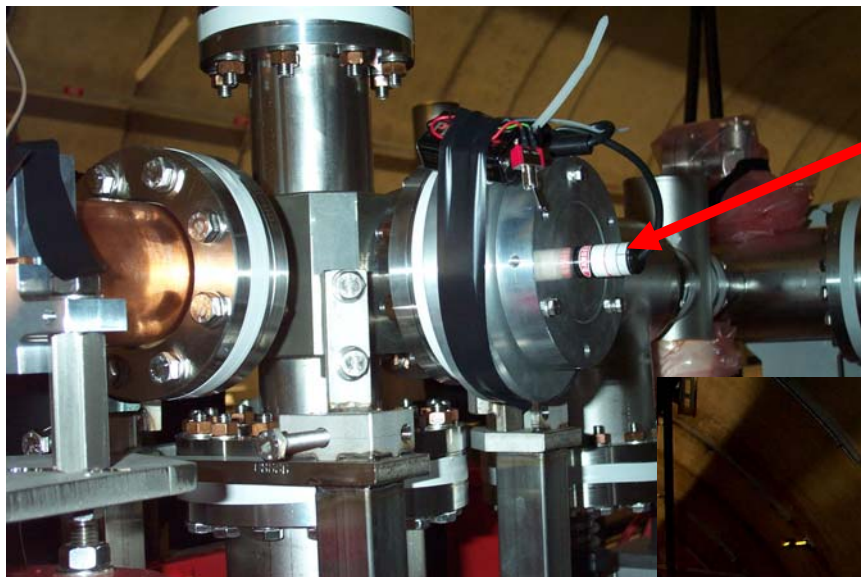
Average resolution for lens 3 $50 \pm 1 \mu\text{m}$

Uniform illumination of the target for the resolution measure



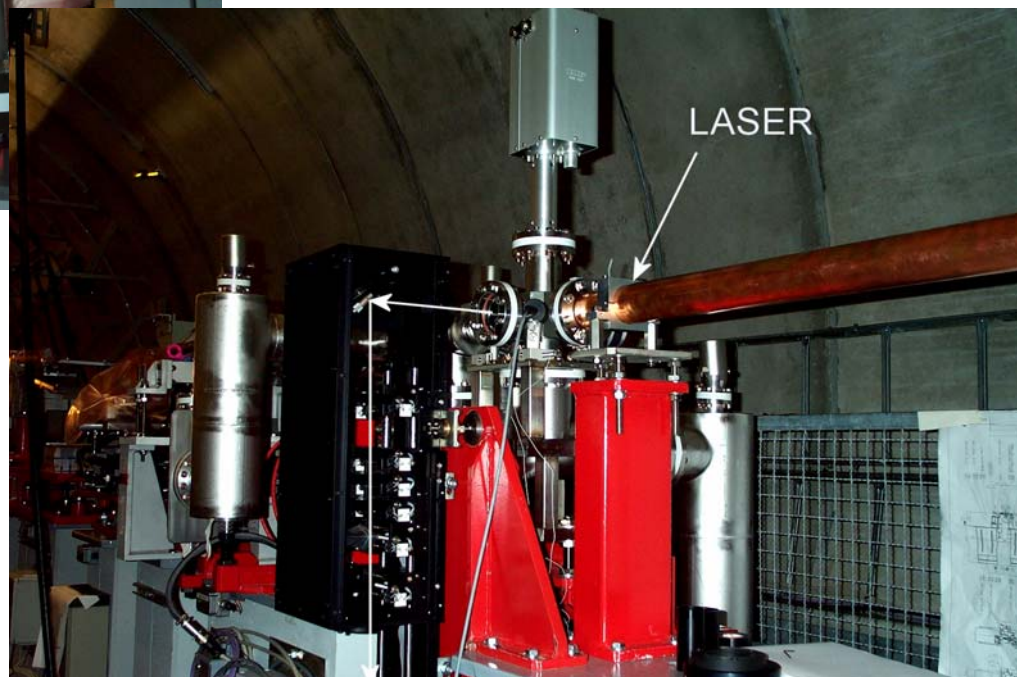
- Electroluminescence foil
- Flat, uniform, it is possible to cut in different size and shape and still works
- Up to 1400 lux
- Great improvement in target illumination

Alignment in the tunnel



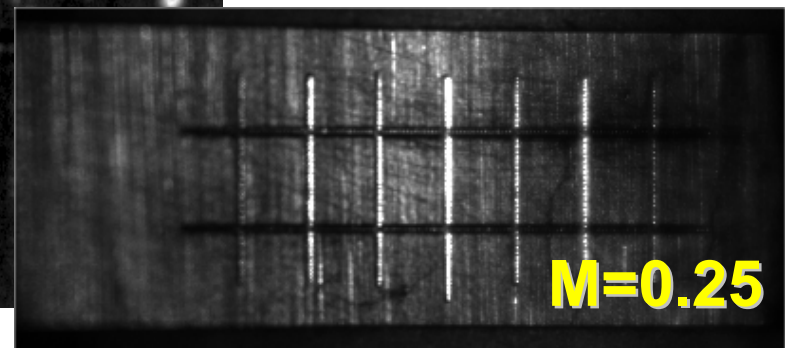
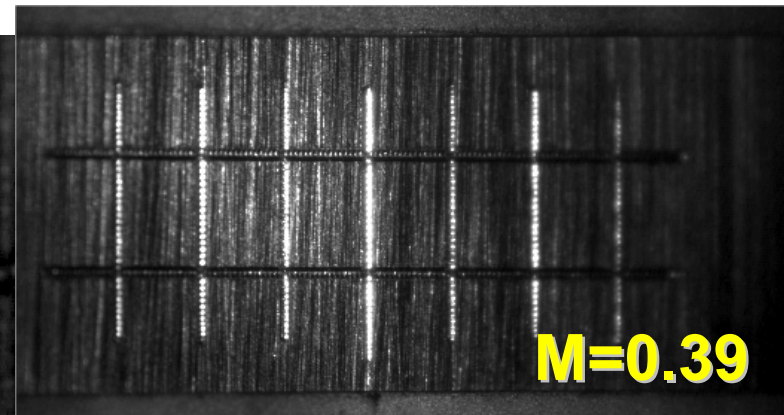
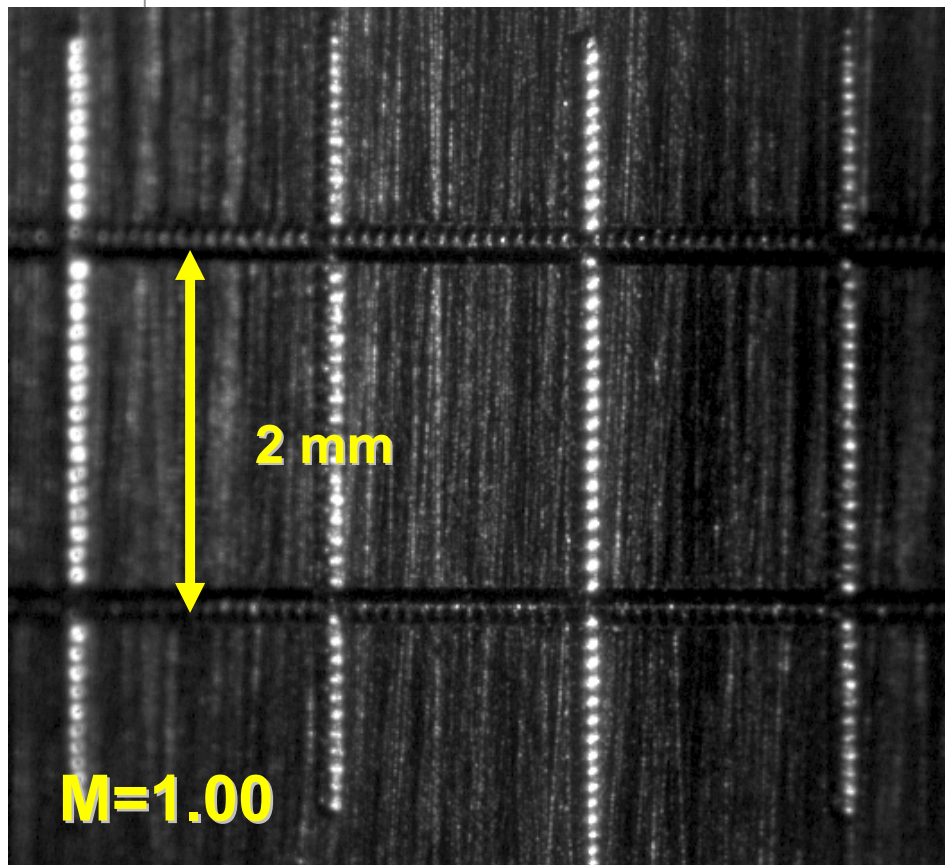
Laser

- Mechanical alignment
- Laser alignment computer assisted
- Focusing adjustment



LASER

Calibration screens

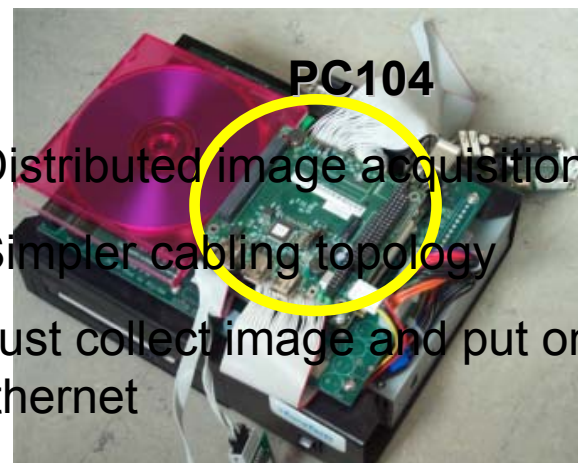


Camera Acquisition System



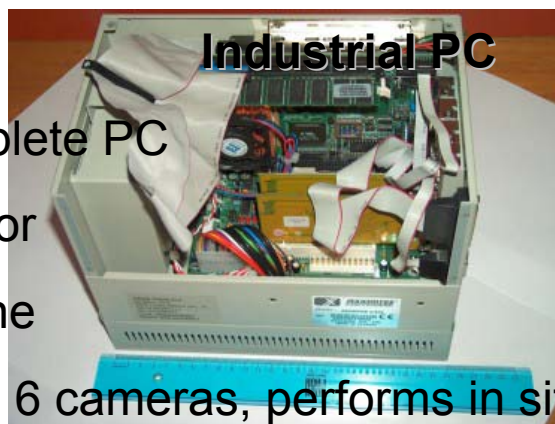
- Large number of Hub is needed
- All of them must be powered
- Just a cable extension

Hub based system



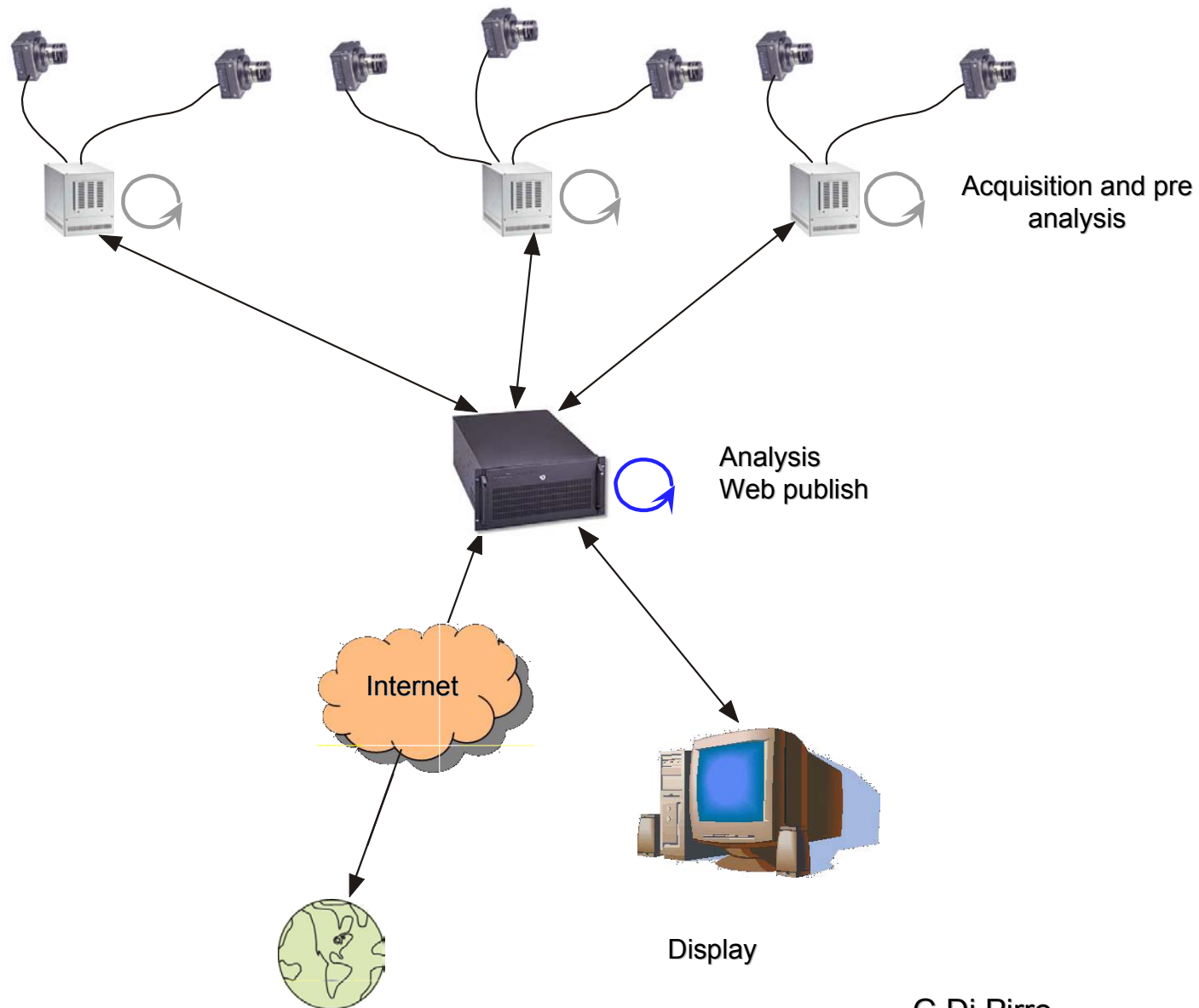
- Distributed image acquisition system
- Simpler cabling topology
- Just collect image and put on Ethernet

PC104 based system



- Robust and complete PC
- 1,2 GHz processor
- Passive backplane
- Can control up to 6 cameras, performs in situ some elaboration
- Overall system better and cheaper than PC104

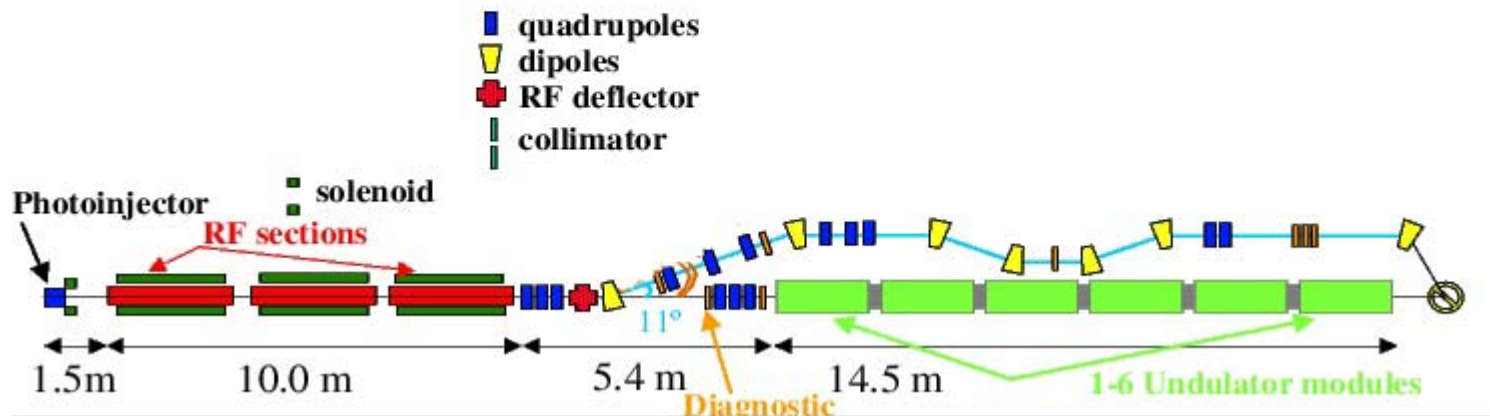
Industrial PC



TTF2 activities status

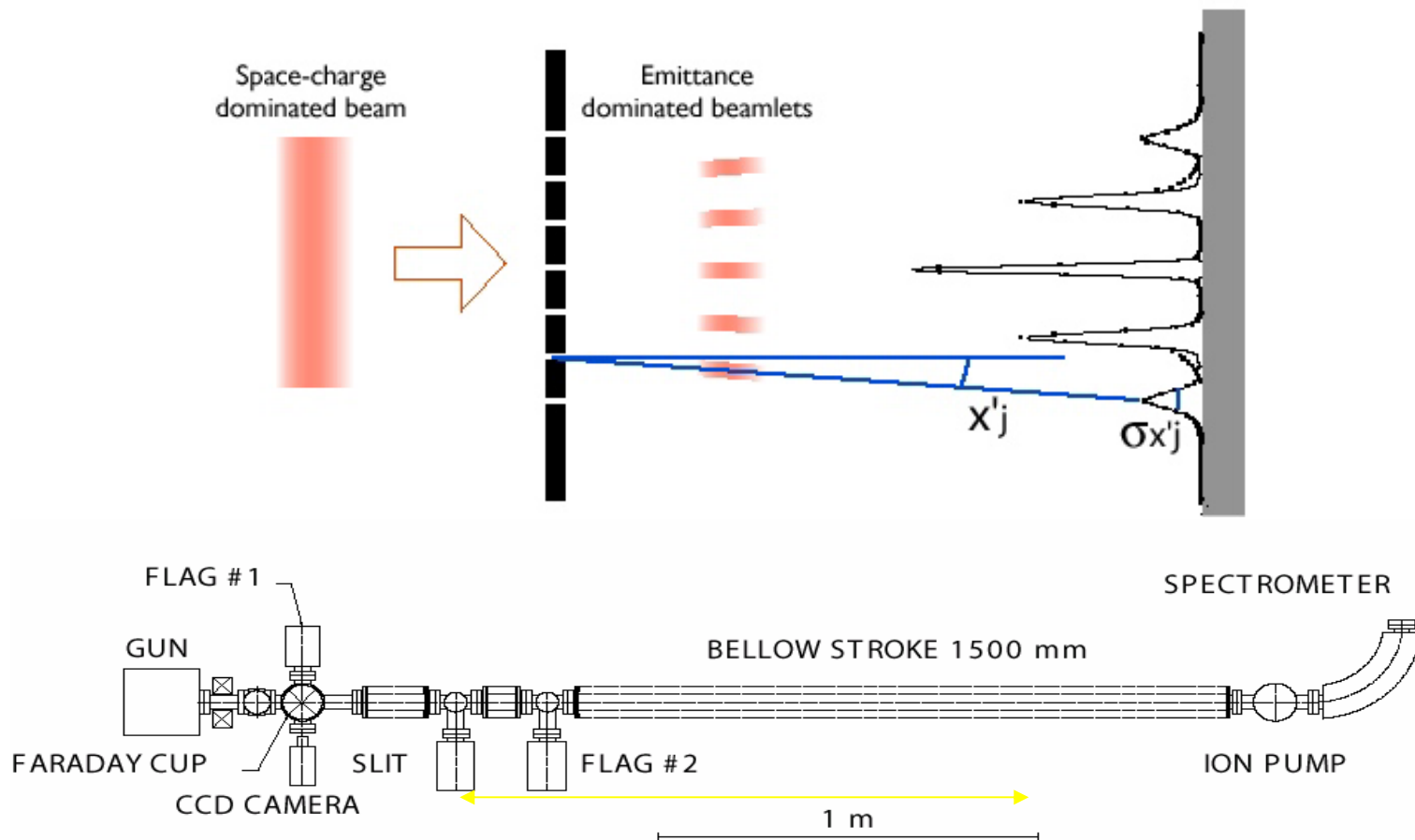
- 5 systems mounted and aligned in the tunnel
 - A fast check is needed
 - Beam is needed for final commissioning
- 7 more systems will be mounted in February
- First release of the image server software with camera acquisition hardware is under way and will be installed in mid February

SPARC



Energy	150 MeV
Bunch charge	1.1 nC
Repetition rate	1-10 Hz
Rms normalized transverse emittance	<2 mm-mrad

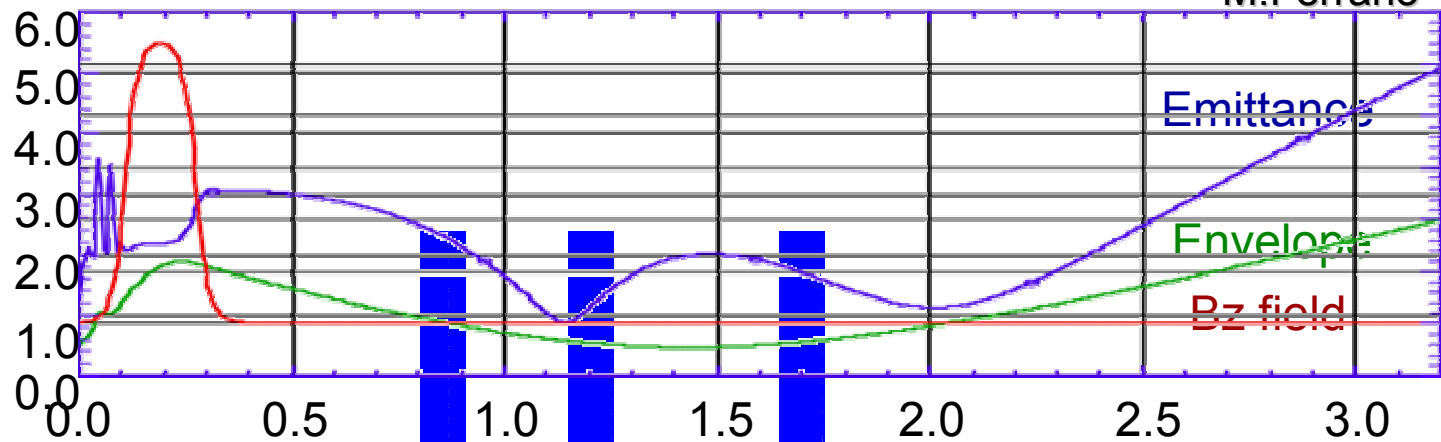
Emittance meter



M. Boscolo, A. Cianchi, M. Ferrario, L. Picardi, M. Quattromini, C. Ronsivalle, J. Rosenzweig
Status of the low-energy emittance measurement simulation for the sparc project
 SPARC-BD-03/005

Different behavior of the beam along z

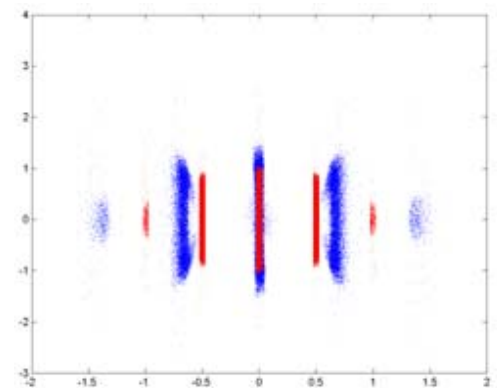
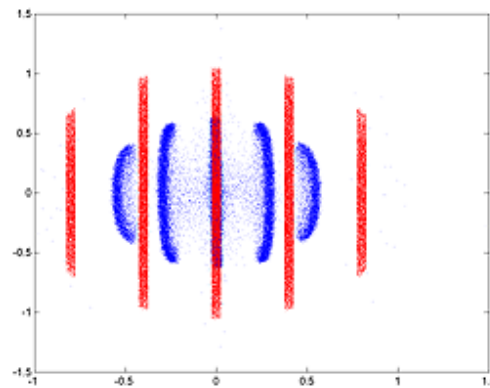
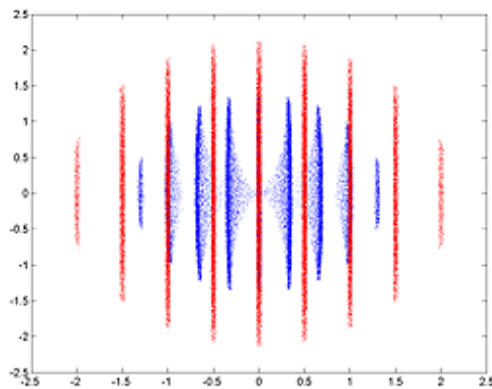
M.Ferrario



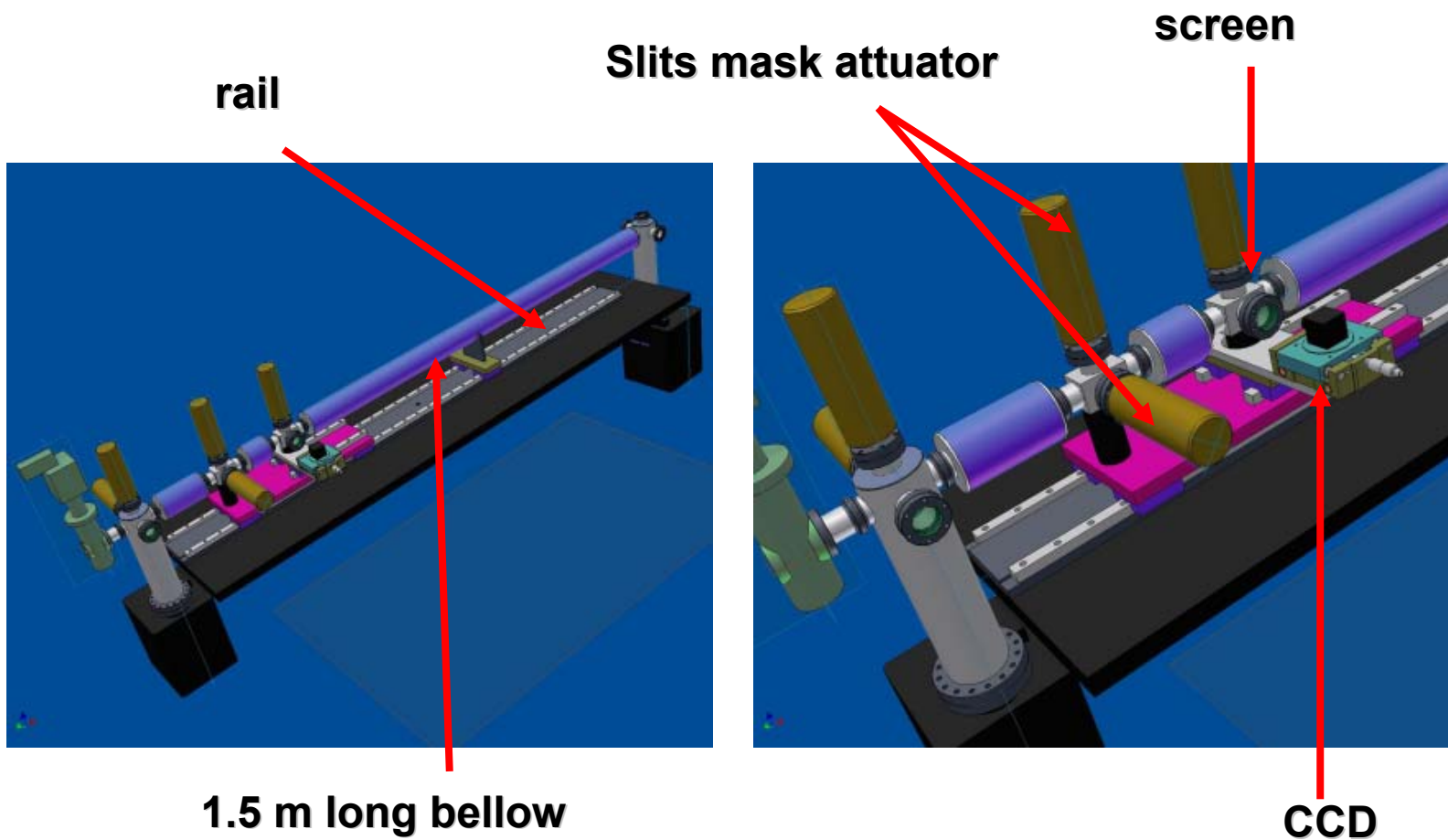
Z= 85 cm

Z= 120 cm

Z= 170 cm



Design



Drawing from V.Lollo & A. Clozza LNF Vacuum group

Work in progress

- Layout defined for the emittance meter
- Optics design
- R&D on screen material (YAG, Beryllium oxide, Cromax) is under way at Dafne BTF Linac
- Measurement simulations to be completed with more realistic beam conditions
- Analysis tools