SPARC activities at Roma2

INFN-Roma2
(L.Catani)

Status of Emittance-Meter system

Meeting on SPARC Emittance-Meter - 11 March 2004

Participants: L.Catani, G. Di Pirro, V.Fusco, E.Chiadroni, A.Cianchi, M.Castellano, D.Filippetto, S.Tazzari, A.Clozzza, M. Ferrario

Status Report from A.Clozza:

	Pepper-pot machined and delivered to LNF It still needs to be cleaned
	Order for bellows signed (~25 kEUR): • 2 x long bellows • 1 x short • 3 months delivery times
	Minimum distance from cathode to pepper will be ~83cm
	Design of the overall system in under way and should be completed in few weeks.

Discussion

	the possibility of tilting the pepper-pot holder is considered as not critical. The angular acceptance is large enough (25 mrad) to avoid any disturbance to the measurement if the pepper-pot will be properly aligned.	
requirement	**Simulations including tilted pepper-pot** should be carried out (A.Cianchi) to confirm this analysis providing more detailed information	
	Steerings are desirable to correct beam misalignment in the long e-meter structure	
requirement	Vertical resolution of the pepper-pot position must be better than 25 μm provided the accuracy of the movement is **<2μm**	
	Speed of vertical movement is not an issue	
requirement	**4-phase** stepper motor **200 steps/turn**	
requirement	Absolute Optical Encoder: accuracy must be better than **10 μm** (in principle it should be compatible with the required resolution being **2 μm**)	
	For the fluorescent/YAG screen a three positions movement (out, in, calibration) will be sufficient. Precision of the movement is not an issue though the same mechanical components as for the pepper-pot could be used for compatibility. Some calibration system (either a calibration target or some calibration marks on the screen frame) will be needed and it must be discussed.	
	YAG screen with back-observation is so far preferred to ceramic screen	
	Performances and limitations of YAG screen have been discussed taking into account results available in the literature. Calibration of YAG radiator should be performed to evaluate the possible dependency of the beam size with the beam charge density. We should consider to buy a set of crystals to be measured at BTF.	
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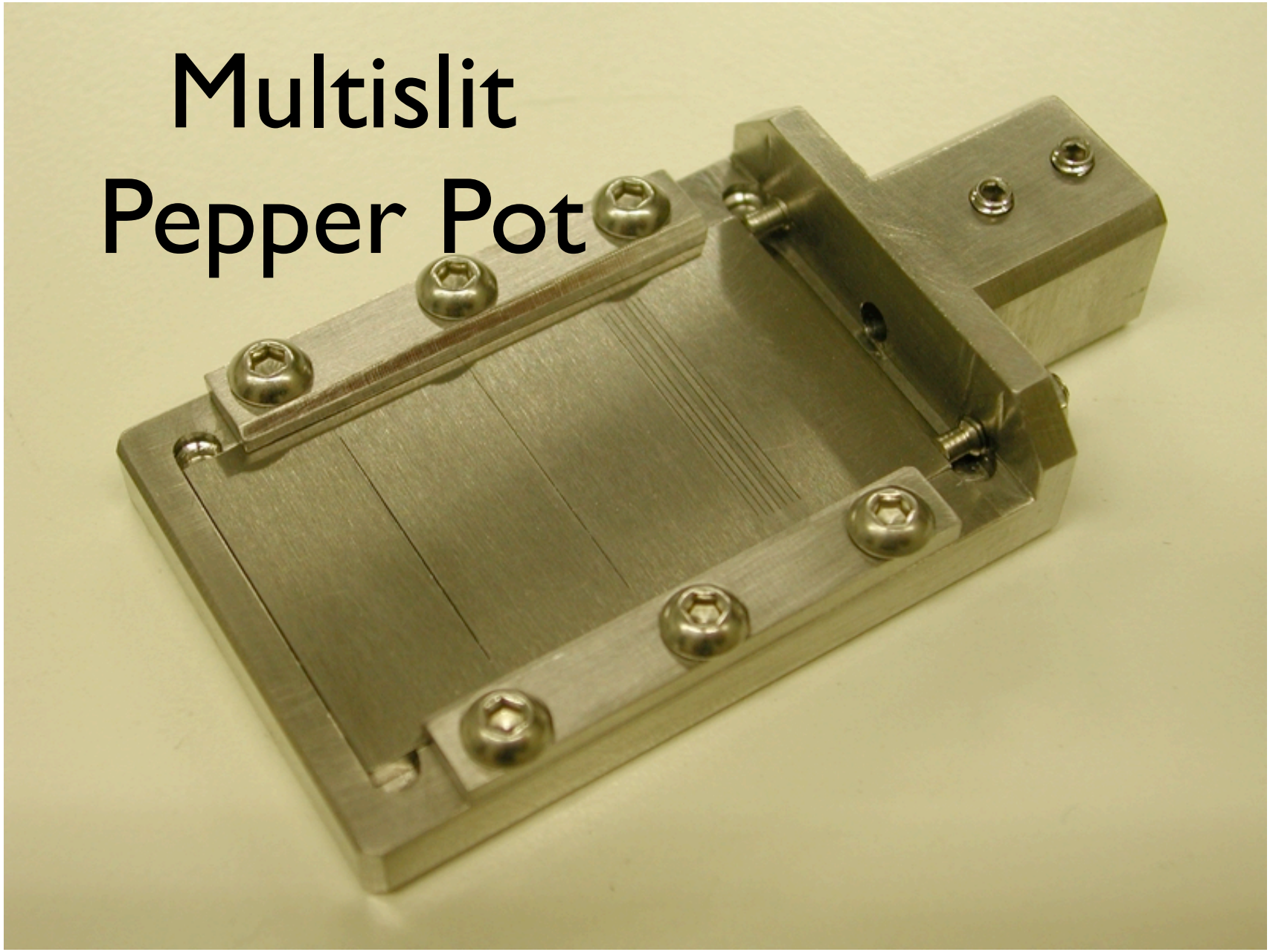
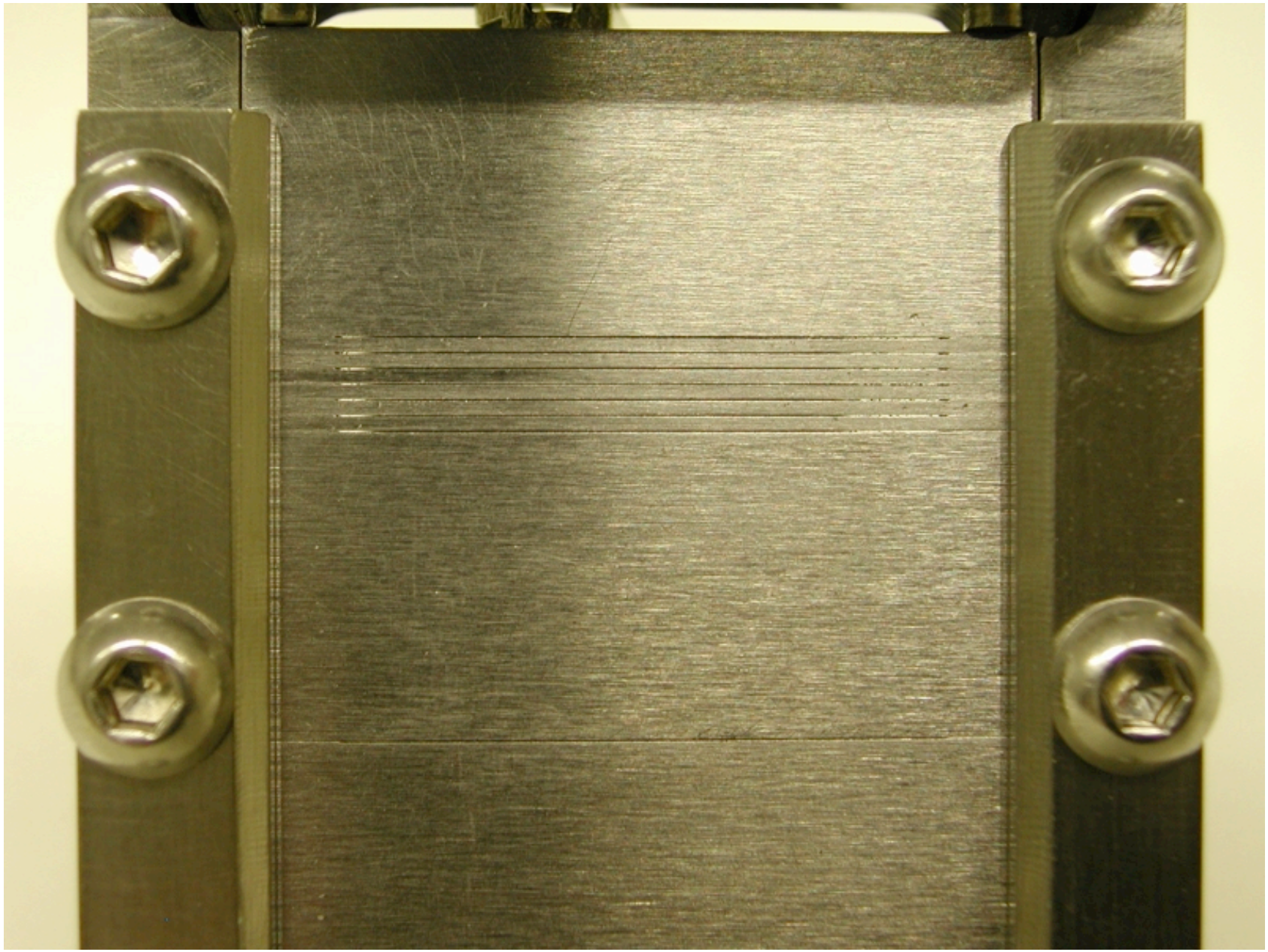
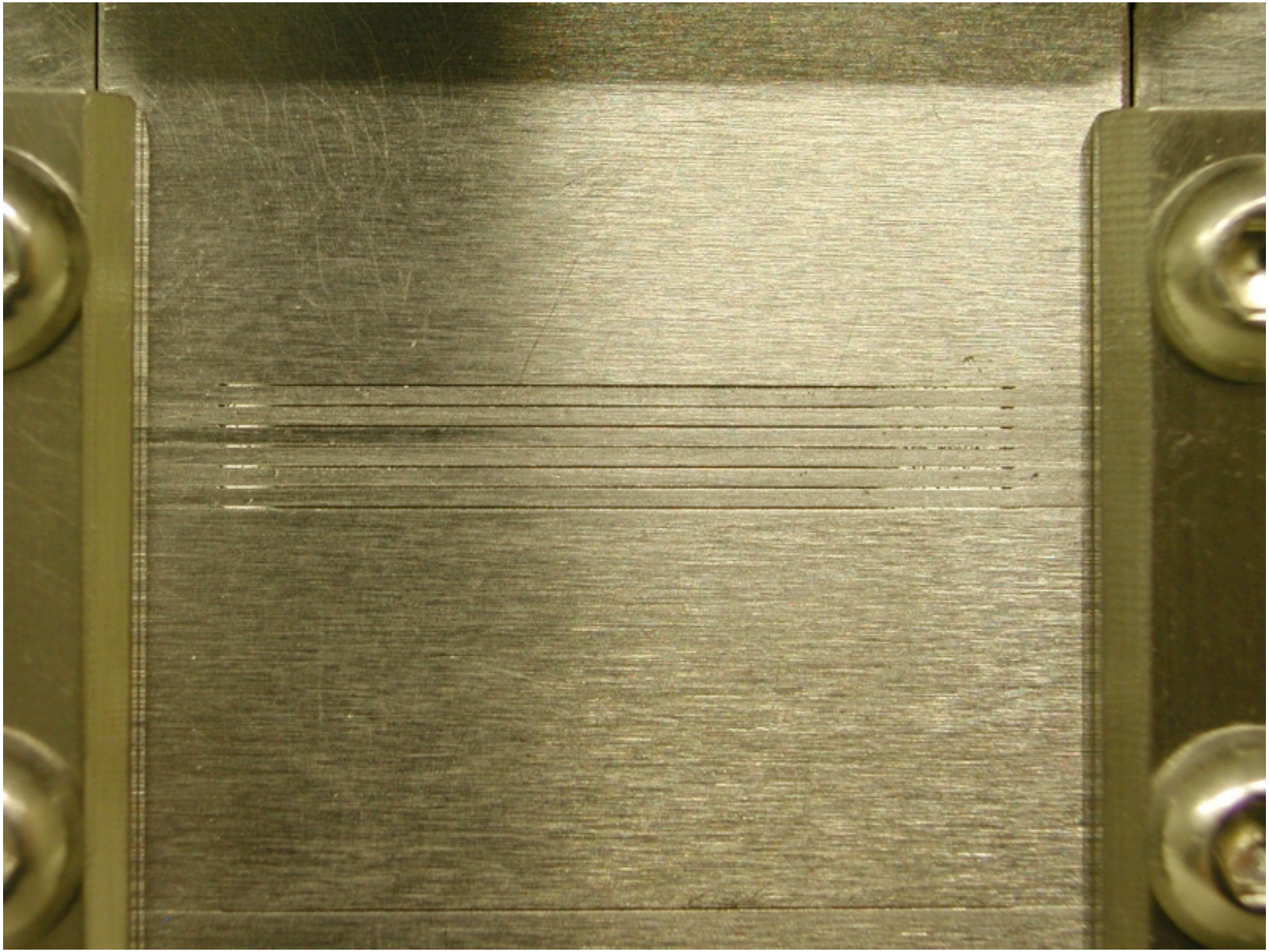
Multislit Pepper Pot

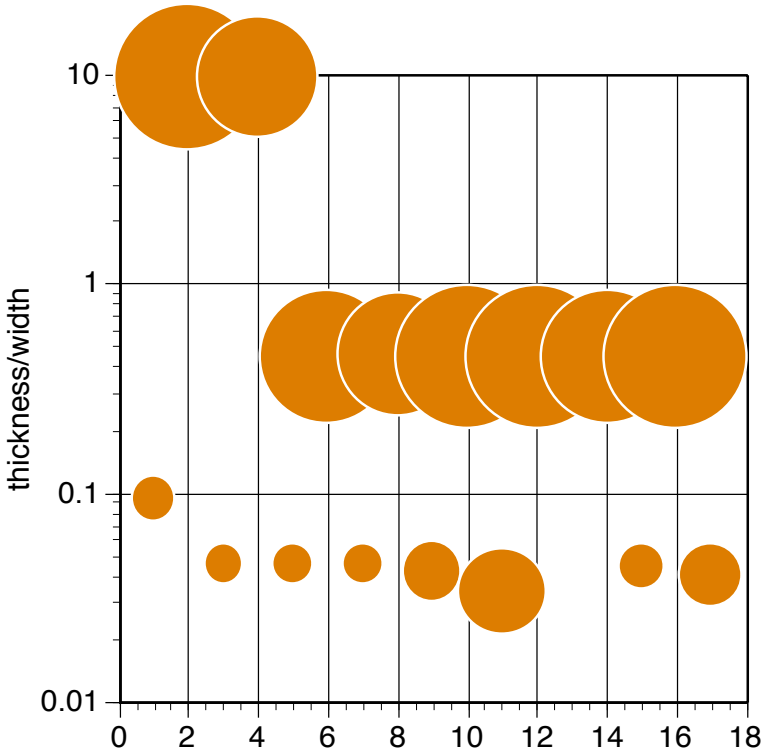






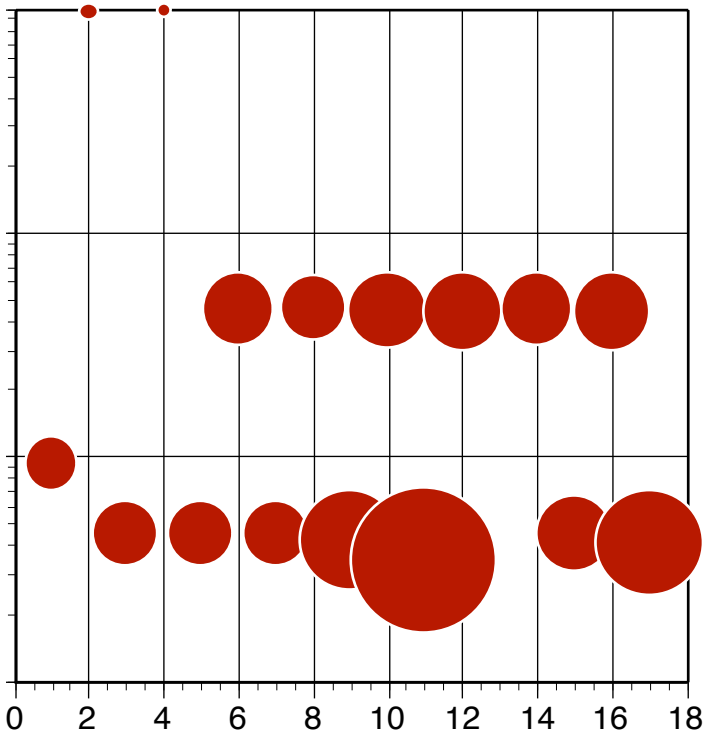
Multislit Pepper-Pot machining accuracy

	slit#	size (mm)	exp. (mm)	err (mm)
100 μm	1	0.0960	0.1000	0.0040
	spacer	9.9600	10.0000	0.0430
50μm	2	0.0470	0.0500	0.0030
	spacer	9.9700	10.0000	0.0290
array of 50μm slits	3	0.0470	0.0500	0.0030
	spacer	0.4640	0.5000	0.0360
	4	0.0470	0.0500	0.0030
	spacer	0.4700	0.5000	0.0300
	5	0.0430	0.0500	0.0070
	spacer	0.4590	0.5000	0.0410
	6	0.0350	0.0500	0.0150
	spacer	0.4580	0.5000	0.0420
	7	0.0500	0.0500	0.0000
	spacer	0.4640	0.5000	0.0360
	8	0.0460	0.0500	0.0040
	spacer	0.4580	0.5000	0.0420
	9	0.0420	0.0500	0.0080



Multislit Pepper-Pot (relative errors)

	slit#	size (mm)	exp. (mm)	err (mm)
100 μm	1	0.0960	0.1000	0.0400
	spacer	9.9600	10.0000	0.0043
50μm	2	0.0470	0.0500	0.0600
	spacer	9.9700	10.0000	0.0029
array of 50μm slits	3	0.0470	0.0500	0.0600
	spacer	0.4640	0.5000	0.0720
	4	0.0470	0.0500	0.0600
	spacer	0.4700	0.5000	0.0600
	5	0.0430	0.0500	0.1400
	spacer	0.4590	0.5000	0.0820
	6	0.0350	0.0500	0.3000
	spacer	0.4580	0.5000	0.0840
	7	0.0500	0.0500	0.0000
	spacer	0.4640	0.5000	0.0720
	8	0.0460	0.0500	0.0800
	spacer	0.4580	0.5000	0.0840
	9	0.0420	0.0500	0.1600



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Status of PCI-PCI Link development

Meeting on PCI-PCI link for the SPARC DAQ/Control System - 11 March 2004
Participants: L.Catani, G. Di Pirro, M.Castellano, A.Salamon, E.Gabrielli, M.Sabene, G.Salina, A.Stecchi

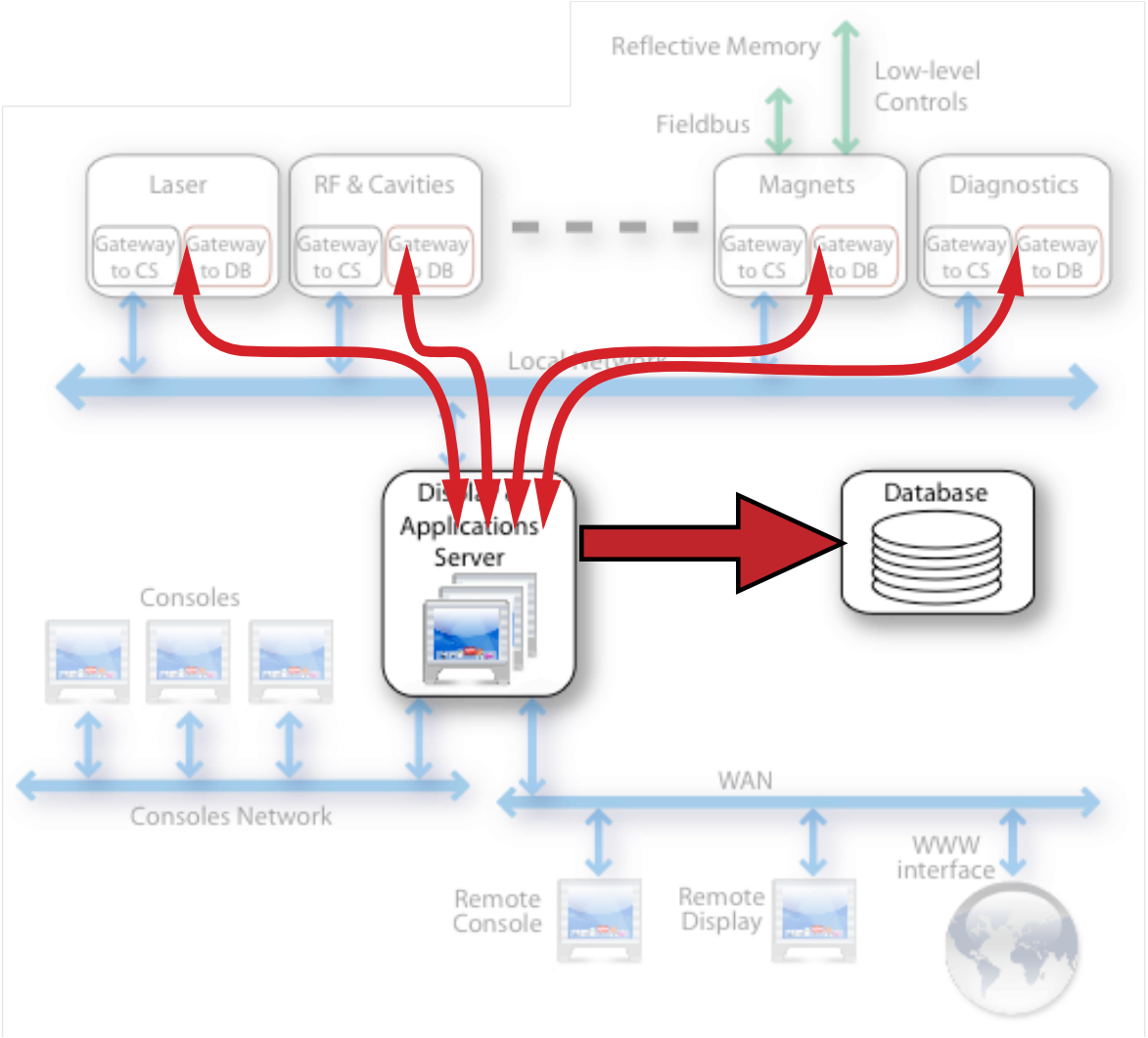
Status Report from A.Salamon:

Board developed for 64 bit/66Mhz PCI
Compatible (in principle) with PCI-X (64bit/133Mhz)
On-board memory: single-chip SRAM are available with either1 Mbyte dual–port or 8 Mbytes single-port. Performances of the PCI-PCI link depends on the choice of the SRAM memory type
2 Mbits bi-directional fiber-optic link has been chosen

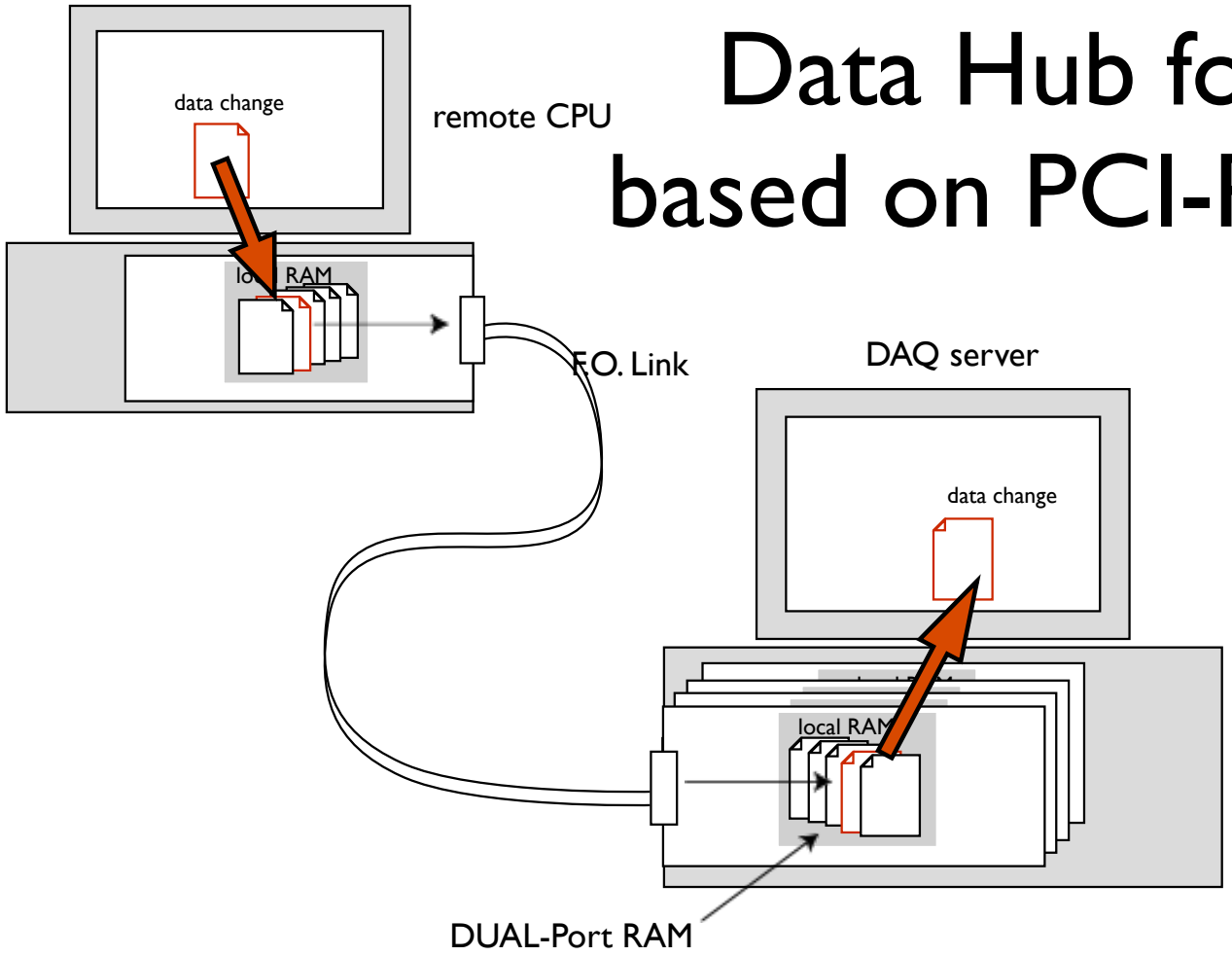
Discussion

	Single-port SRAM is cheaper than dual-ported counterpart. One 8 Mbyte s-p SRAM cost approx. the same as on 1 Mbyte d-p SRAM (~200 EUR)	
	d-p SRAM allows simultaneous read (from PCI) and write (from f.o. link) maximizing the overall data throughput. In this case some control on the memory access must be foreseen to avoid conflicts when R/Writing the same memory location. This functionality should be provided by the on-board FPGA	
	s-p SRAM doesn't support simultaneous R/W; as consequence the above conflict cannot take place. The main disadvantage is the reduced PCI-PCI data throughput. It is in principle halved but this figure can be slightly improved reading data as longwords (they are written 16 bits)	
	A second level of handshaking is needed to assure data consistency when R/Writing the same block of memory locations (e.g. when a local application is reading a data block being currently updated with data received from the f.o. channel)	
	Any conflict due to simultaneous access to the same memory location/block must be solved giving priority to the writing process, i.e. (new) data coming from the f.o. channel	
decision	An on-board memory of 1 Mbyte has been considered as appropriated for most of the applications foreseen in the SPARC DAQ and control system. Larger memory size might be needed only for large data structure as 16-bit 640x480 image maps. Standard 8-bit 640x480 images will fit into a 1 Mbyte mirrored-memory This solution will provide the maximum achievable data throughput.	
decision	Next step of the development will focus on: • Designing a PCI-PCI 1 Mbyte mirrored-memory • Evaluate the compatibility of the above design with extended on-board memory up to 4 Mbytes • 2 Mbits f.o. link	
	Cost of a set of PCI-PCI link should cost ~2.5 kEUR to be compared with ~5 kEUR of the commercial competitor.	
decision	So far only unidirectional data transfer has been taken into account. This feauture is sufficient for DAQ application of the PCI-PCI link The possibility to have bidirectional memory-mirroring must be discussed	
decision	A set of boards (at least two) will be ready to be tested with DAQ and Control System applications in 6 months	
	Next meeting will be scheduled when new results from the Roma2 group will be available	

DAQ


Reflective Memory
Low-level Controls
Fieldbus
Laser
RF & Cavities
Magnets
Diagnostics
Gateway to CS
Gateway to DB
Applications Server
Database
Consoles
Consoles Network
WAN
Remote Console
Remote Display
WWW interface

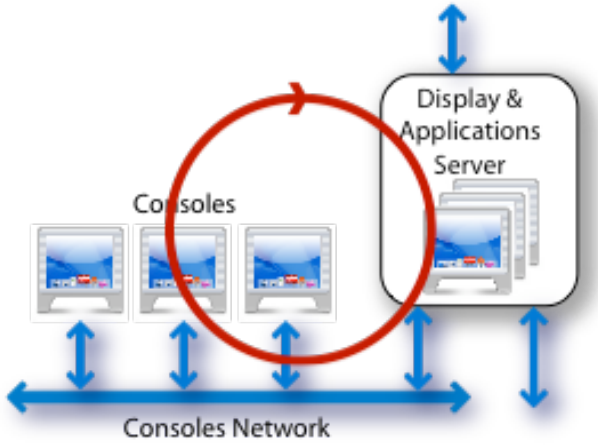
Data Hub for DAQ based on PCI-PCI link



e-LogBook

- e-LogBook for SPARC (based on TTF e-LogBook) has been developed and is operational on a temporary server (http://elog.roma2.infn.it/MYelog/index.jsp)

possible configurations to investigate



thin-clients (Dafne)

workstations (TTF)

hybrid (Linux Terminal Sever)

other..(distributed resources- ex. openmosix.org)

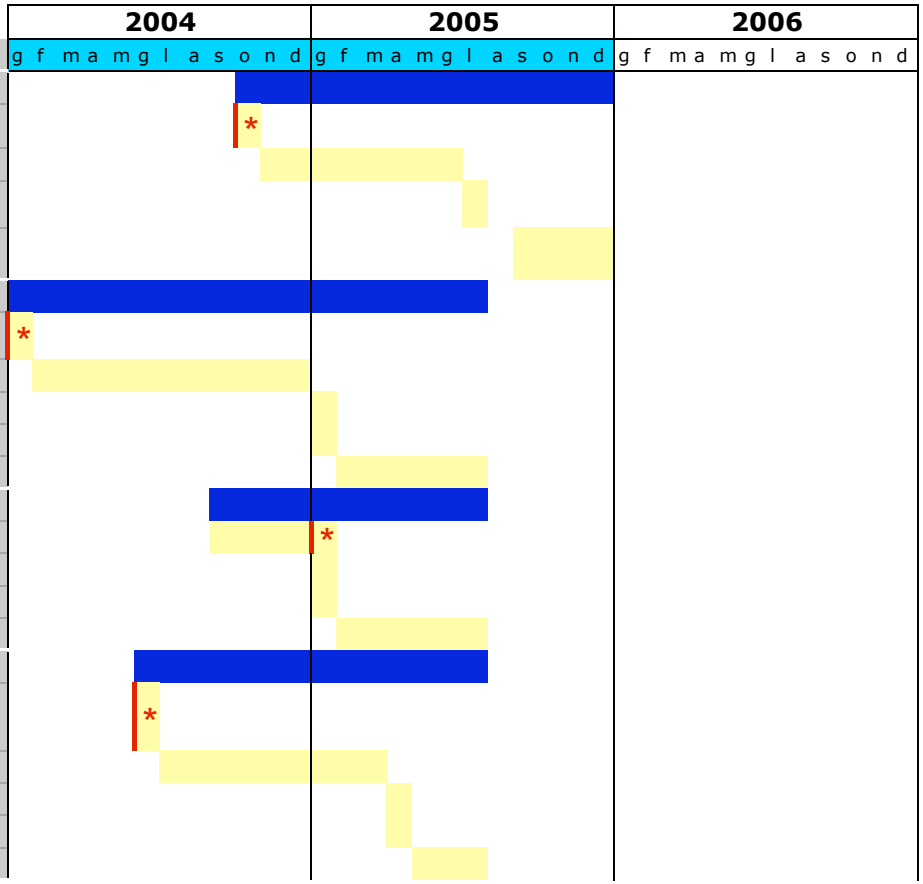
< preliminary
< results

WBS for the Emittance-meter

topics	sub-topic	milestones	who		2004 g f m a m g l a s o n d	2005 g f m a m g l a s o n d	2006 g f m a m g l a s o n d
		31-12-2004					
meccanica e vuoto		**31-12-2004**					
	progettazione	15-02-2004	**LNF**	RM2			
	offerte	15-05-2004	**LNF**	RM2			
	ordini	30-06-2004	**LNF**	RM2			
	realizzazione	31-10-2004	**LNF**				
test fenditure		**31-10-2004**	**LNF**	RM2			
movimenti longitudinali e discendenti targhette (motori stepper, elettronica)		**31-10-2004**					
	progettazione	30-06-2004	LNF	**RM2**			
	offerte	15-07-2004	LNF	**RM2**			
	ordini	31-07-2004	**LNF**				
	realizzazione	31-10-2004	LNF	**RM2**			
telecamera e sistema ottico		**31-10-2004**					
	ordini hardware per sviluppo e prog.	1-01-2004		**RM2**	*		
	progettazione	30-06-2004		**RM2**			
	offerte	15-07-2004		**RM2**			
	ordini	31-07-2004	**LNF**				
	realizzazione	31-10-2004	LNF	**RM2**			
sistema di controllo e acquisizione		**31-11-2004**					
	progettazione	30-06-2004	LNF	**RM2**			
	offerte	15-07-2004	LNF	**RM2**			
	ordini	31-07-2004	**LNF**		*		
	realizzazione	31-11-2004	LNF	**RM2**			
software di analisi	realizzazione	**30-10-2004**		**RM2**			

OTR diagnostics

		31-12-2005		
telecamera alta sensibilità		**31-12-2005**		
	ordine telecamera per tests	31-10-2004		**RM2**
	test telecamera	30-06-2005	LNF	**RM2**
	ordine telecamera scelta	15-07-2005	**LNF**	
	collaudo e installazione	31-12-2005	LNF	**RM2**
obbiettivo MACRO		**30-07-2005**		
	ordini obb.macro per sviluppo	1-01-2004		**RM2**
	studio e test	31-12-2004		**RM2**
	offerte	15-01-2005		**RM2**
	ordini	31-01-2005	**LNF**	
	realizzazione	30-07-2005	LNF	**RM2**
remotizzazione obbiettivo MACRO		**31-07-2005**		
	progettazione	31-12-2004*	* dipende dalla disponibilit	**RM2**
	offerte	15-01-2005		**RM2**
	ordini	31-01-2005	**LNF**	
	realizzazione	30-07-2005	LNF	**RM2**
sistemi ottici		**31-07-2005**		
	ordine sistema di sviluppo (componenti ottiche)	1-06-2004		**RM2**
	progettazione	31-03-2005		**RM2**
	offerte	15-04-2005		**RM2**
	ordini	31-04-2005	**LNF**	
	realizzazione	31-07-2005	LNF	**RM2**



Controls

					2004	2005	2006
		31-03-2006			g f m a m g l a s o n d	g f m a m g l a s o n d	g f m a m g l a s o n d
Console system		31-05-2004					
	ordini hardware per sviluppo	1-01-2004		RM2	*		
	test e progettazione	31-05-2004		RM2			
e-Logbook		31-10-2004					
	sviluppo e test	30-06-2004		RM2			
	installazione e attivazione	31-10-2004		RM2			
DAQ		31-03-2006					
	test prototipo	31-10-2005	LNF	RM2			
	progettazione	31-12-2005	LNF	RM2			
	offerte	15-01-2006	LNF	RM2			
	ordini	1-02-2006	LNF	RM2			
	realizzazione	31-03-2006	LNF	RM2			

Struttura	Resp. loc.: Luciano Catani
RM2	

PREVENTIVO LOCALE DI SPESA PER L'ANNO 2004

In KEuro

VOCI DI SPESA		DESCRIZIONE DELLA SPESA	IMPORTI Parziali SJ		Totale Compet.	SJ	A cura della Comm.ne Scientifica Nazionale
Viaggi e missioni	Interno	meeting collaborazione, sviluppo e collaudo a LNF di componenti	3.0		***3.0***	***0.0***	
	Estero	conferenze (EPAC, PCaPAC) collaborazione con DESY/Zeuthen e incontri scientifici	5.0 7.0		***12.0***	***0.0***	
Materiale Consumo		licenze software (Windows XP Embebbed, LabVIEW) modulistica CAN e kit di sviluppo sistemi ottici e movimentazioni	3.0 5.0		***8.0***	***0.0***	
Trasp. e facch.					***0.0***	***0.0***	
Spese Calcolo		Consorzio / Ore CPU / Spazio Disco / Cassette / Altro			***0.0***	***0.0***	
Affitti e manutenz. apparecchiat.					***0.0***	***0.0***	
Materiale inventariabile		telecamera digitale Alta Risoluzione e software di controllo PC104 + kit di sviluppo server rack–mounting scheda IEEE1394 per il controllo della telecamera cavi IEEE1394 alta qualità e ripetitore ottico IEEE1394	4.5 2.5 3.0 3.0		***13.0***	***0.0***	
Costruzione Apparati					***0.0***	***0.0***	
				Totale	***36.0***	***0.0***	

Sono previsti interventi e/o impiantistica che ricadono sotto la disciplina della legge Merloni ? ☐
Breve descrizione dell'intervento:

Mod EC./EN. 2 (a cura del responsabile locale)

+2.0 k€ DAQ, e-Logbook collaboration

- components for the optical resolution test-stand
- camera objective remote control

+1.5 k€ Switch Gigabit Ethernet
+2.0 k€ RAID system

41.5 k€ (total)