

July 24th 2013

Update on INFN-JLAB12 Collaboration involvement in HPS

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INFN commitment in HPS will be under INFN-JLAB12 with old and new groups

- GE, RM2
- SS/CA, CT, TO, PD

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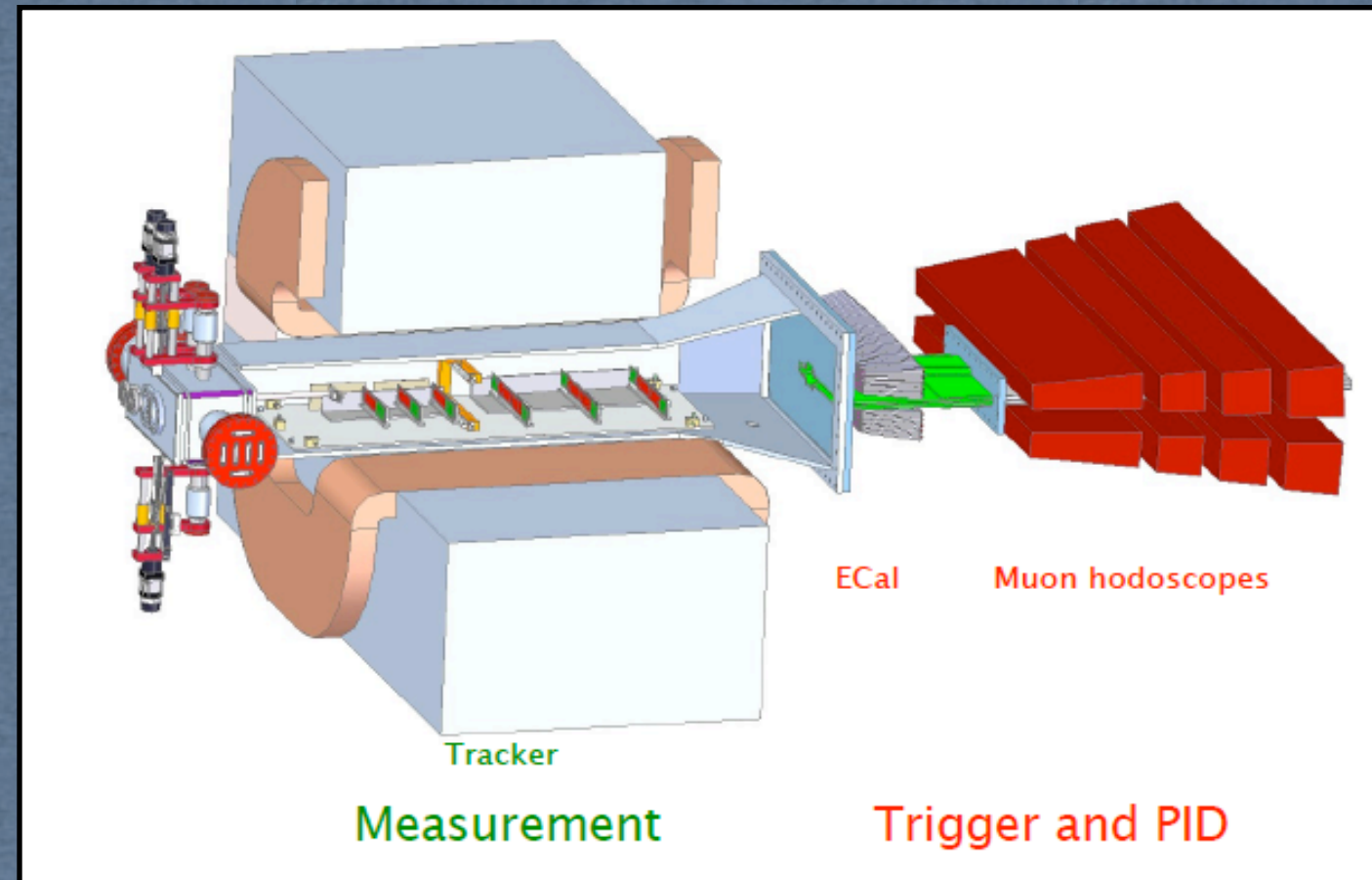
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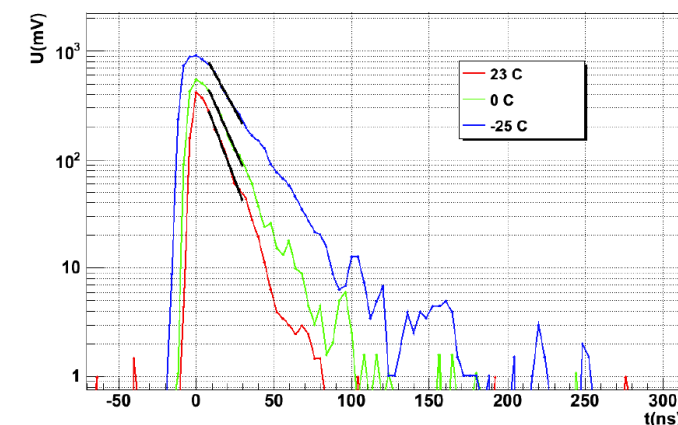
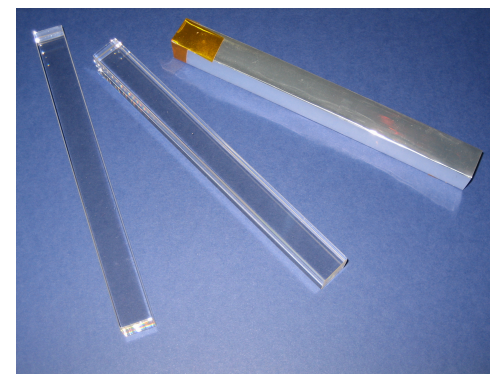
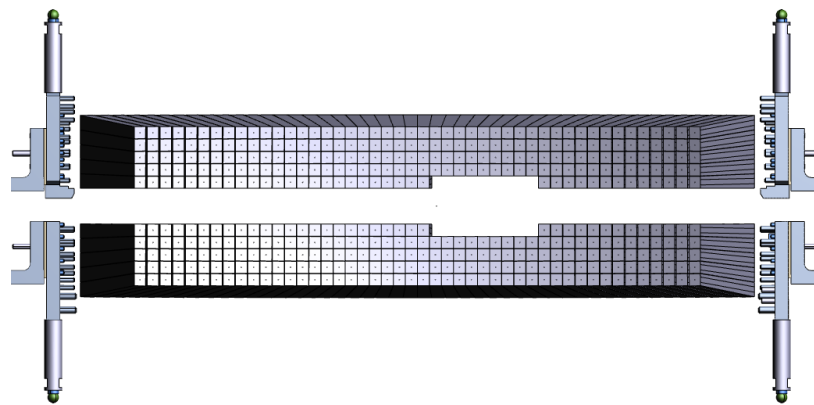
The INFN commitment in HPS

- * Due to our large commitment in the Hall-B Forward Tagger (FT-Cal) we are mainly interested in contributing to the ECal
- * Some solutions have already been tested on FT-Cal design, making our action efficient and effective (hopefully!)



HPS ECal

- 442 PbWO crystals
- APD readout (0.5x0.5 cm²)
- Thermal stabilized at 0.5 °C
- 15 mrad off beam axis

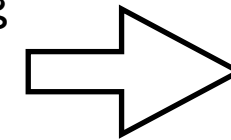


- * Recoil electron detection (see M.Osipenko talks tomorrow)
- * Data analysis: ECAL (monitoring: 80h, calibration&reconstruction: 80h) + TRCK (alignement: 80h)

New motherboard (design and construction)

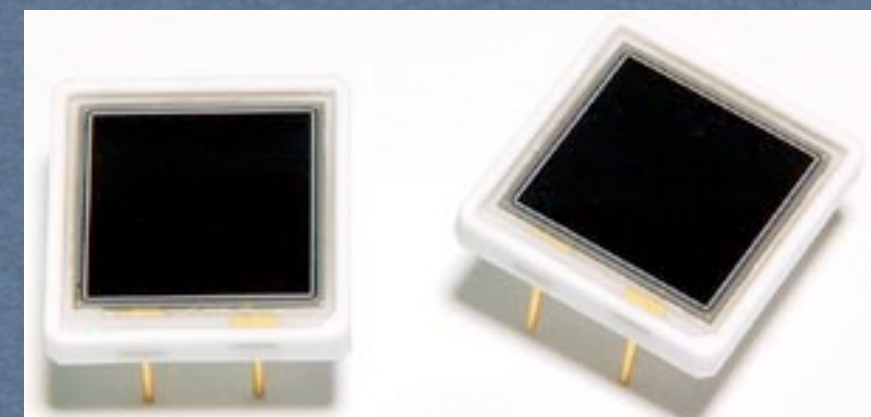
ECal Light Monitoring System (design)

- * Channel matching
- * Check crystal/sensor optical coupling
- * Crystal transparency
- * Gain and stability
- * Front-end electronic linearity

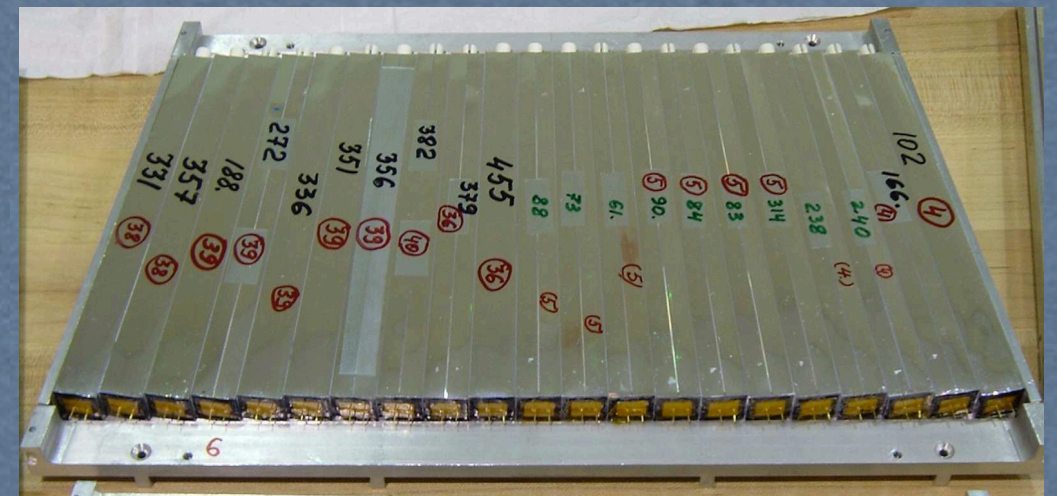
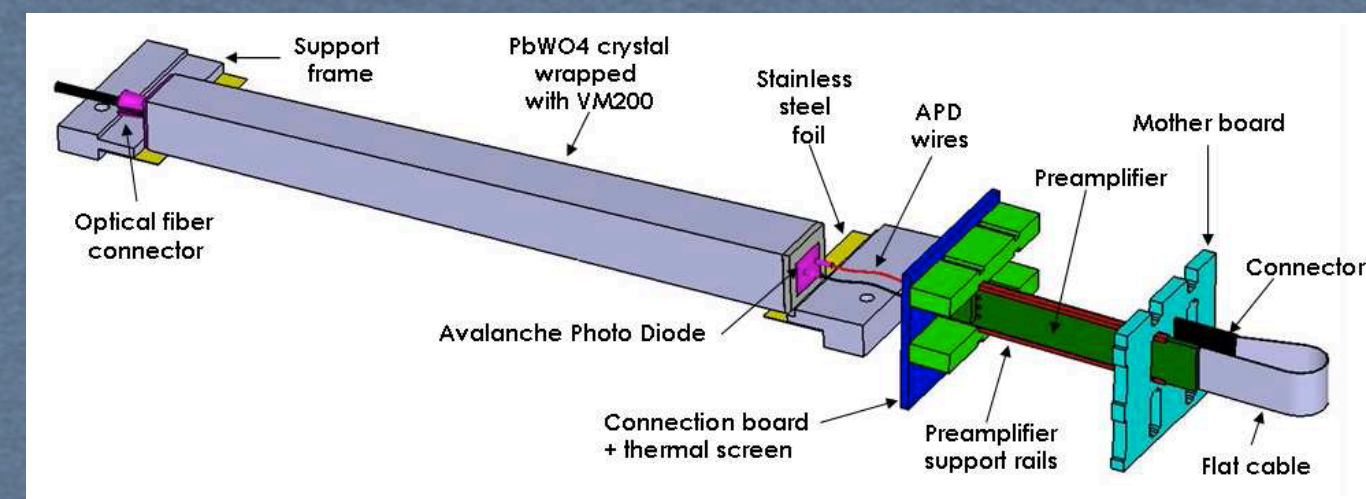


- * Custom circuit from INFN-GE EW
- * Individual blue LED (470nm)
- * All specs fulfilled

Photo sensors (APD)



- * New Motherboard design and manufacture
- * ECal LMS design
- * Plan to replace the existing APD (CMS-like) with the new LAAPD
- * Qualify the new sensors
- * Replacing old APDs with new



Scheduling

New motherboards design	GE	Jul13-Sep13
Iterations with Orsay MecDes	Ge Orsay	Jul13-Sep13
New motherboards production and test (with FT-Cal crystals)	GE	Oct13 - Dec13
LED LMS design and prototype	GE	Sep13-Dec13
LED holders design	GE	Jul13-Sep13
LED holders production	CT	Sep13-Dec13
Tooling for crystal gluing	GE	Oct13 - Dec13
Tooling for crystal assembly test	GE	Oct13 - Dec13
Tooling for LAAPD benchmarking	GE	Jan14-March14
LAAPDs procurements		Oct13 - May14
LAAPDs benchmarking	JLab	May14-Jun14
New LED holder replacement	JLab	Jan14-March14
Crystals test for regrouping	JLab	Jan14-Apr14
APD replacement	JLab	Jun14-Jul14
Crystals test and benchmarking	JLab	Jul14-Aug14
ECAL assembly	JLab	Aug14-Sep14

Manpower

Activity	Workers	FTE (total)	Travel days	INFN Units
Motherboards design	EE	30		GE
Motherboards tests	EE, TC	35	15	GE, TO
	EE	15		GE
	ME	5		GE
	TC	5	5	TO
	TC	10	10	TO
LED LMS design/prototyping	EE, TC	35	5	GE, TO
	EE	30		GE
	TC	5	5	TO
LED holders design	ME	10		GE
LED holders production	TC	20		CT
LAAPD benchmarking tooling	EE, TC	11	10	GE, RM2, CT
	EE	5		GE
	EE	3	5	RM2
	TC	3	5	CT
Crystal cleaning tools and proc. optimiz.	TC	11	10	GE, CT, CA
	TC	5		GE
	TC	3	5	CA
	TC	3	5	CT
Crystal gluing tools and proc. optimiz.	TC	26	10	GE, CT, CA
	ME	5		GE
	TC	10		CA
	TC	5		GE
	TC	3	5	CA
	TC	3	5	CT
Crystal assembly test tooling and proc. opt.	EE, TC	49	15	GE, CT, CA
	ME/EE	25		GE
	TC	10		CT
	TC	5		GE
	TC	3	5	CA
	TC	3	5	CT
	EE	3	5	CT
Total		140		GE
Total		15	25	CT
Total		20	20	TO
Total		9	15	CA
Total		3	5	RM2
Total		187	65	

Activity	Workers	FTE (total)	Travel days	INFN Units
LAAPD benchmarking (500pcs)	EE, TC	31	21	RM2, GE
	1xTC	20		JLab
	1xEE	5.5	10.5	RM2
	1xTC	5.5	10.5	GE
ECal disassembly	EE, TC	51.5	10.5	GE
	2xTC	40		JLab
	1xEE	5		JLab
	1xEE	5.5	10.5	GE
Crystal cleaning (450 pcs)	EE, TC	31.5	31.5	CT
	2xTC	15		JLab
	2xTC	11	21	CT
	1x EE	5.5	10.5	CT
Crystal gluing (450 pcs)	EE, TC	31.5	31.5	CA, CT
	2xTC	15		JLab
	2xTC	11	21	CA
	1xEE	5.5	10.5	CT
Crystal assembly test (450 pcs)	EE, TC	47	42	CA, CT, GE
	2xTC	25		JLab
	1xTC	5.5	10.5	CA
	1xTC	5.5	10.5	CT
	1xEE	5.5	10.5	CT
	1xEE	5.5	10.5	GE
ECal assembly	EE, TC	25		
	2xTC	20		JLab
	1xEE	5		JLab
ECal final tests	EE, TC	46.5	31.5	CT, GE
	2xTC	20		JLab
	1xEE	10		JLab
	1xEE	5.5	10.5	CT
	1xEE	5.5	10.5	GE
	1xEE	5.5	10.5	CA
Total		175		JLab
Total		38.5	73.5	CT
Total		22	42	CA
Total		22	42	GE
Total		5.5	10.5	RM2
Total		263	168	

Budget: INFN contribution

Travel money

Secured

Motherboards (design, production, test)	€13k
LED Light Monitoring System (design, proto)	€5k
LED holders	€5k
LED drivers for crystal tests	€4k
Consumables	€3k
TOT	€30k
TOT (VAT+Cont)	€40k

Motivation	Days/number	Cost (Euro)
Domestic travels	65	13k
Domestic trips	13	5k
JLab travels: detector construction	168	22k
JLab travels: detector commissioning	20	3k
JLab travels: test run	30	4k
JLab travels: collaboration meetings	30	4k
JLab trips	31	31k
Total + 10% contingency		90k

SJ to LAAPD approval

LAAPD (500pcs) Hamamatsu	€215k-70k from Orsay
Tools for crystal assembly	€8k
Tooling for LAAPD benchmarking	€5k
Shipping	€5k
Consumables	€2k
TOT	€235k
TOT (Cont)	€190k

**Funding request to
INFN CSNIII in
July 13, decision in
September 2013**

**Funds only includes equipment

INFN proposal

- * INFN statement ready to be submitted to the HPS Collaboration EC
- * Submitted to INFN-CSNIII
- * Decision expected in September/October 2013
- * We may be able to order LAAPD in October/November 2013: 70k from Orsay + 40k secured for FT + 100k from CSNIII (?)
- * The rest of money will be available Jan 1st, 2014 but the work in Italy is starting in Fall 2013 (travel money for domestic anticipated in September)
- * INFN proposal available here: <http://www.ge.infn.it/~batta/jlab/hps-italy.pdf>
- * Need to formalize membership of new collaborators