



ATLAS IBL Status

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On behalf of Bologna, Genova, Milano, Trento, Udine

Meeting referee, 20 Marzo 2013, Pisa

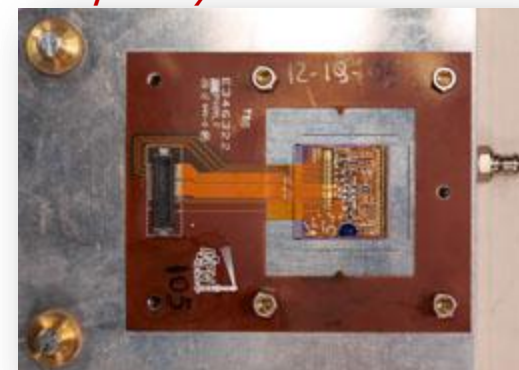
- Stato delle parti di resp italiane o critiche
- Piani di installazione

Phase-0: IBL Modules

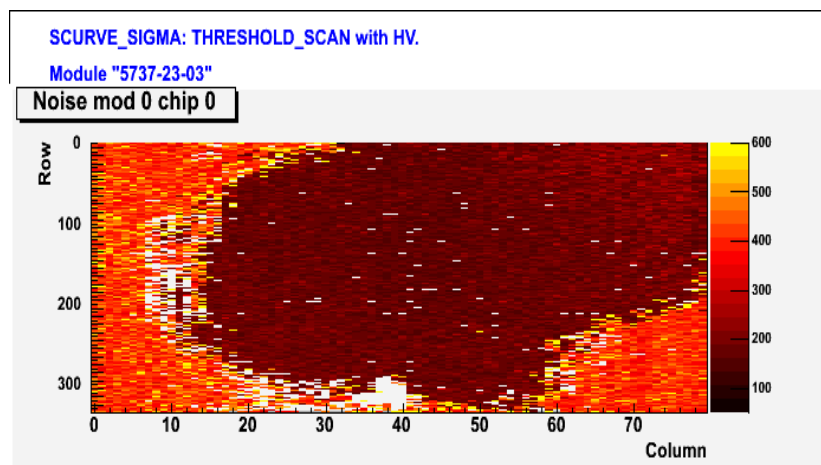


- ✓ Sensori e elettronica prodotti e qualificati.
- ✓ Flex Module prodotti e montaggio SMD quasi completato.
- ✓ A luglio partita la produzione dei moduli: 168 DC e 112 SC sul rivelatore.
 - 3 batch di moduli (139 DC e 124 SC) flip-chipped prima che ci si accorgesse di grossi problemi su gran parte delle device (~ 80%).

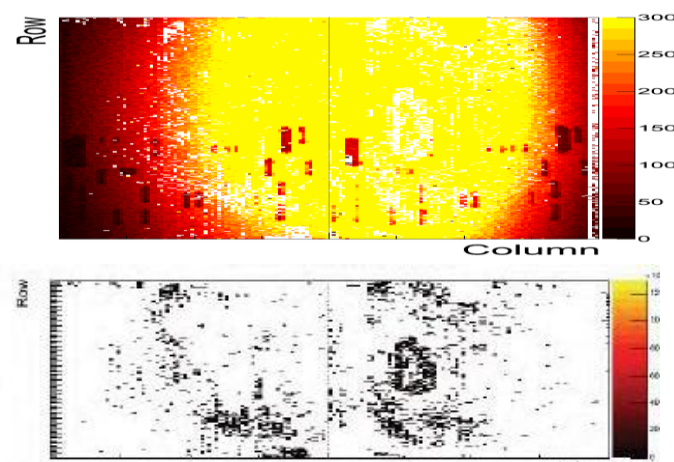
Flex module (SC) with temporary tail



Disconnected Pixels in Noise Scan



*Shorted Pixel:
Source Scan*



Crosstalk with HV

Phase-0: IBL Modules

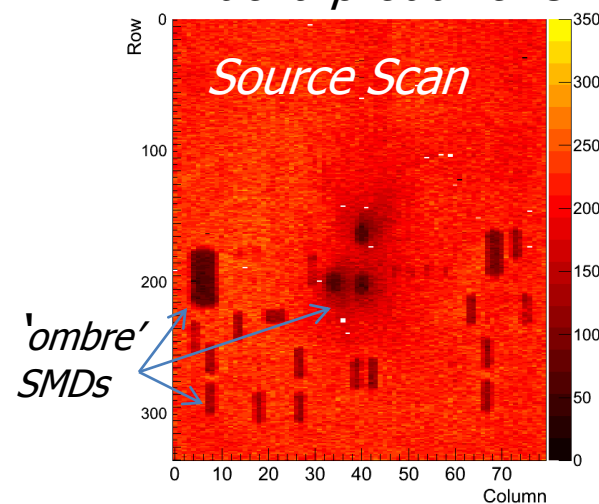


- ✓ Problemi con IZM ora sotto controllo (dovuti a troppo Flussante, ma non completamente capiti, aggirati con nuova macchina/tecnica di flip-chip): 9 DC e 16 SC assemblati e qualificati in Feb e flip-chip ripartito (ad oggi 80/40 DC/SC).
- ✓ Tuttavia ancora ritardi a causa dell'operazione successiva al flip-chip (rimozione laser dello spessore temporaneo).
 - La ditta precedentemente usata (CA) ha ritardi e una nuova (D) e' in qualifica.
 - Accumulato un ritardo di almeno 7 mesi.
 - Module production PRR il 15/2.
 - **Genova** coinvolta per Module Flex (produzione in Phoenix/Mipot e QA) ; produzione e test dei moduli (40 alla settimana tra Ge e Bonn per 1 stave/settimana).

Flussante tra i bumps



Nuova produzione



Phase-0: IBL Staves, 14 needed

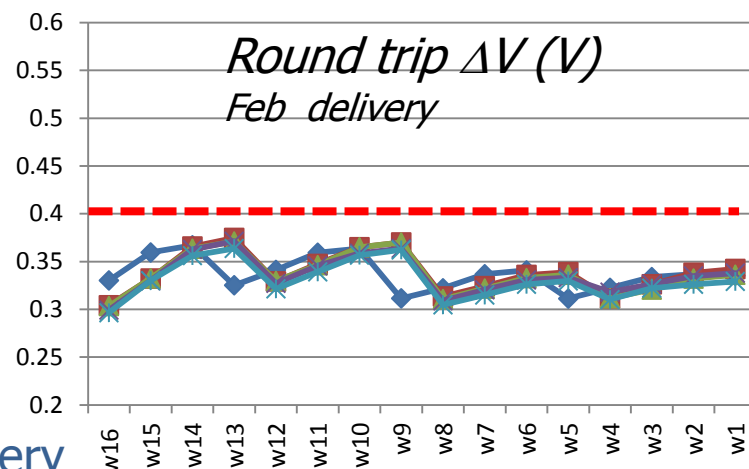


✓ Staves (Milano)

- 4 production stave at CERN for assembly.
- 9 staves at CPPM for metrology survey .
- 12 staves at Wuppertal ready for central support gluing.

✓ Flex Stave (Genova)

- Up to 7 sets available as today. Next delivery foreseen in late March and then 3 more in Spring.
- Quality always needs to be surveyed.



✓ Flex loading (UniGe)

- Well on track. Still a lot of feedback to production labs.
- Two prototype staves well working in SR1.
- First production stave just loaded!!

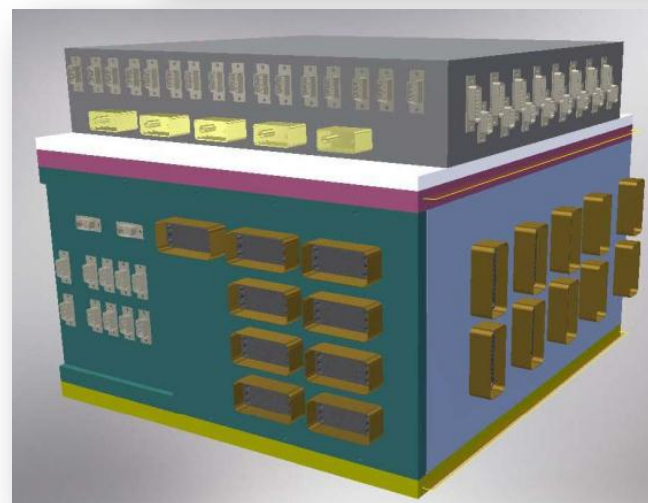


Phase-0: IBL Services



- ✓ ROD (**Bologna**): fase di prototipaggio completata con Rev C.
 - 14 + spare richieste, 5 già prodotte.
 - Produzione di schede per IBL pronta a partire.
 - Ancora in discussione la produzione/installazione di ROD sugli layer Pixel.
 - Commissioning del sistema ROD+BOC +detector (**Bo/Ge**) importante nei prossimi mesi

- ✓ PP2 (**Milano**):
 - Necessari in SR1 in fine estate. Produzione lanciata, prima scatola per Sr1 a inizio Apr.



Phase-0: Schedule



Not all IBL topics	2013												2014			
	Q1			Q2			Q3			Q4			Q1		Q2	
Module production																
Stave production																
Flex production																
Stave loading & QC																
Stave QA	Stave 0															
Type 1 production and tests	Prototypes															
Beam pipe preparation																
IPT assembly																
MPC assembly																
Integration tool																
Brazing stand installation in SR1																
Stave cooling extension - Brazing	Tests and validation															
Stave integration																
Type 0/1 integration																
Stave tests																
Prep. for commissioning work																
Full commissioning test																
													Option 1		Option2	
IBL inside Pixel detector																
Installation of the Pixel detector																

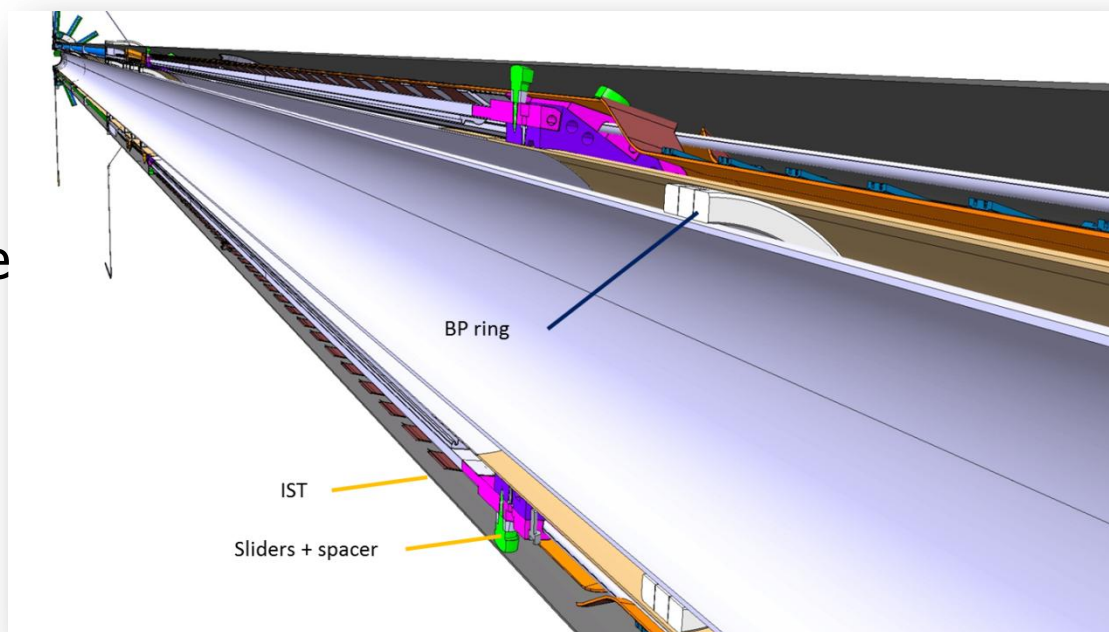


ATLAS starts close-out to fit LHC schedule.

IBL: installazione

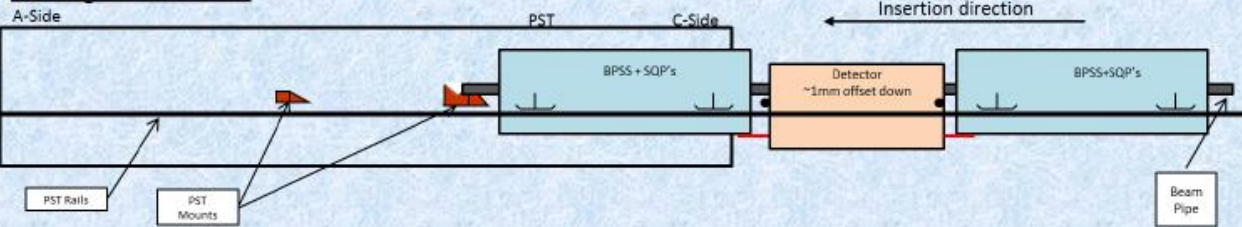


- ✓ Pixel in SR1 from April 18th 2013 to April 1st 2014
- ✓ Motivations to Pixel Detector on surface
 - 1. Physics and performance for b-tagging - Recovery of a significant amount of Pixel modules with n-SQP installation (up to 65 out of 88 bad links).
 - 2. Insertion risks and readiness of the IST (IBL Support Tube) installation.
- ✓ IST (tube containing IBL) will be installed in the Pixel package on surface.
- ✓ IBL can be either inserted on surface (Jan14) or in the pit (Apr14).
 - Pit solution is favourite both for schedule and for the movement of the full pixel package when inserted in ATLAS.

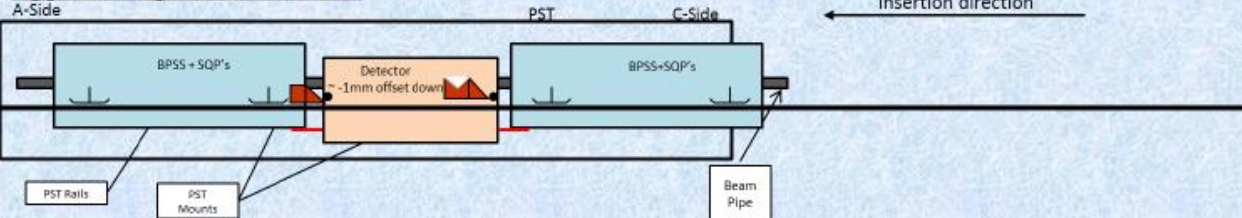




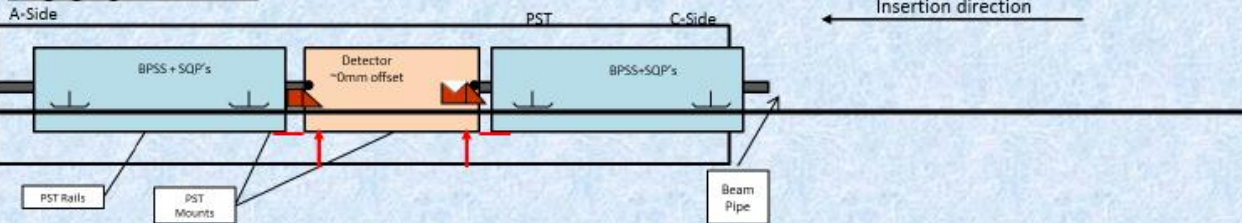
During the insertion



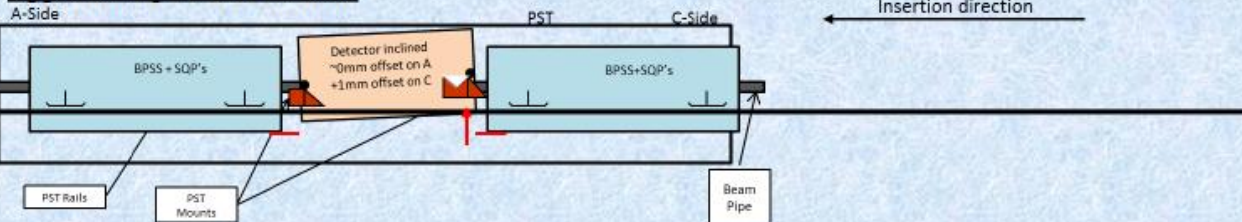
Approaching the PST mounts



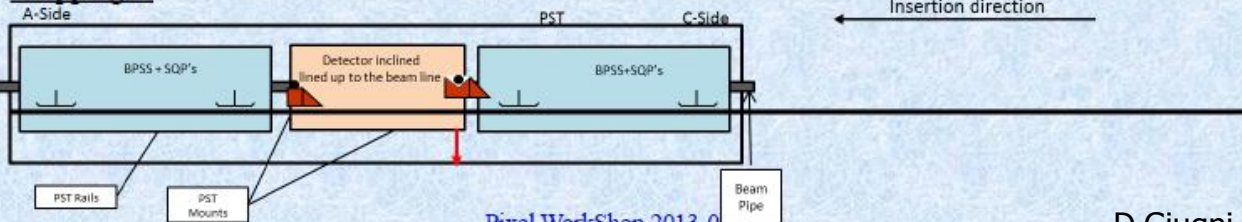
Engaging the mounts



Approaching the PST mounts



Snapping in

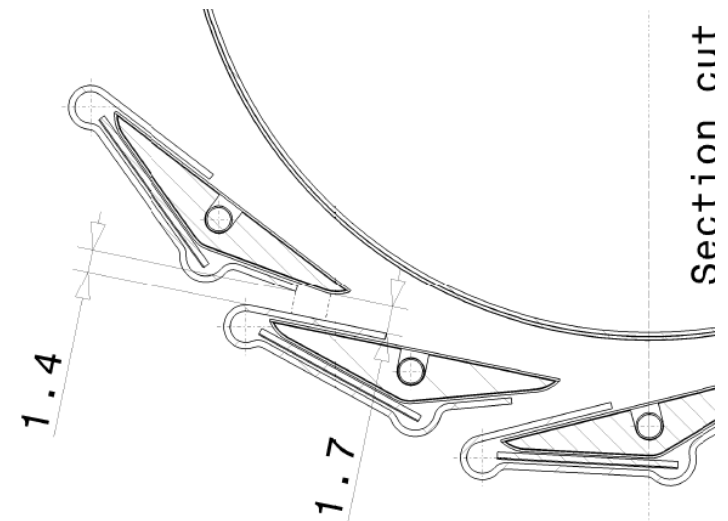
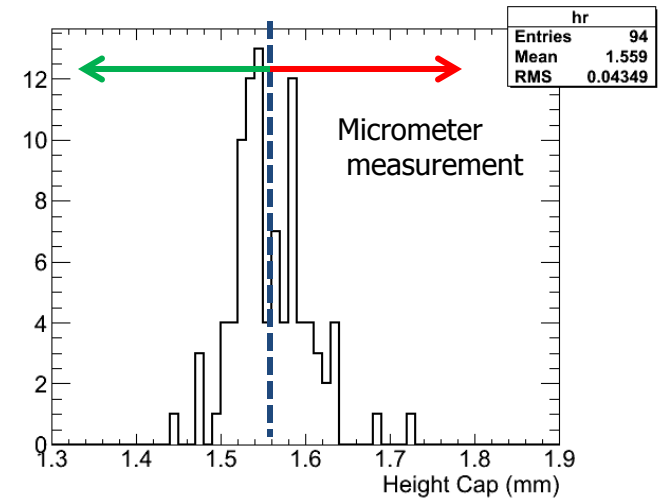
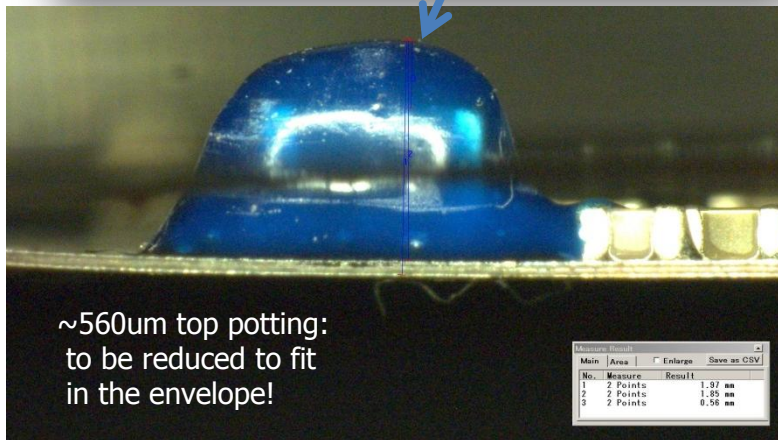
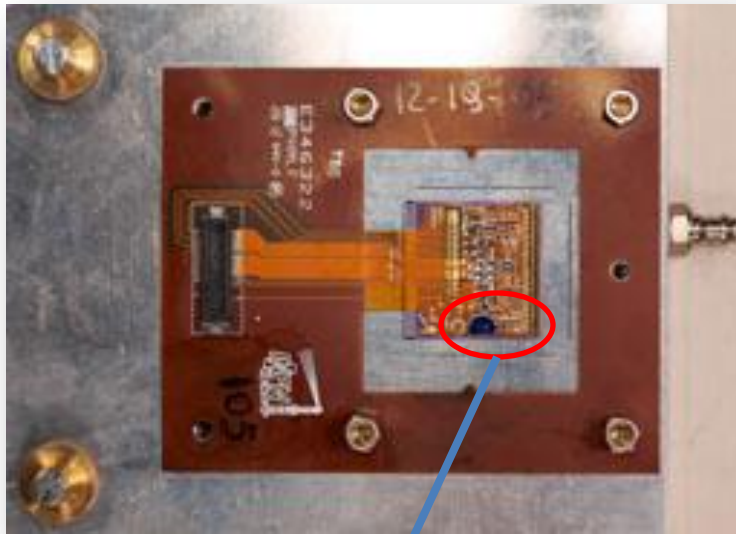


- ✓ The *detector swing during the engagement on the PST mounts is ~2mm. This was ok* since the gap was 9mm to the beam pipe.
- ✓ IST is much closer to the B-Layer (less than 2mm in radius).
- ✓ *Much better would be to support the IST off the detector frame. IST will follow the swing without reducing the clearance to the B-Layer.*
- ✓ If IBL is inserted on surface: The operation is fast end safe. Nevertheless the IBL weight, now supported by the pixel mounts, drives some structural concerns on the strengths of the supports.



Spare

Dettagli dell'ultima ora



Phase-0: Pixel non IBL



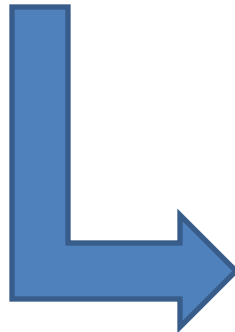
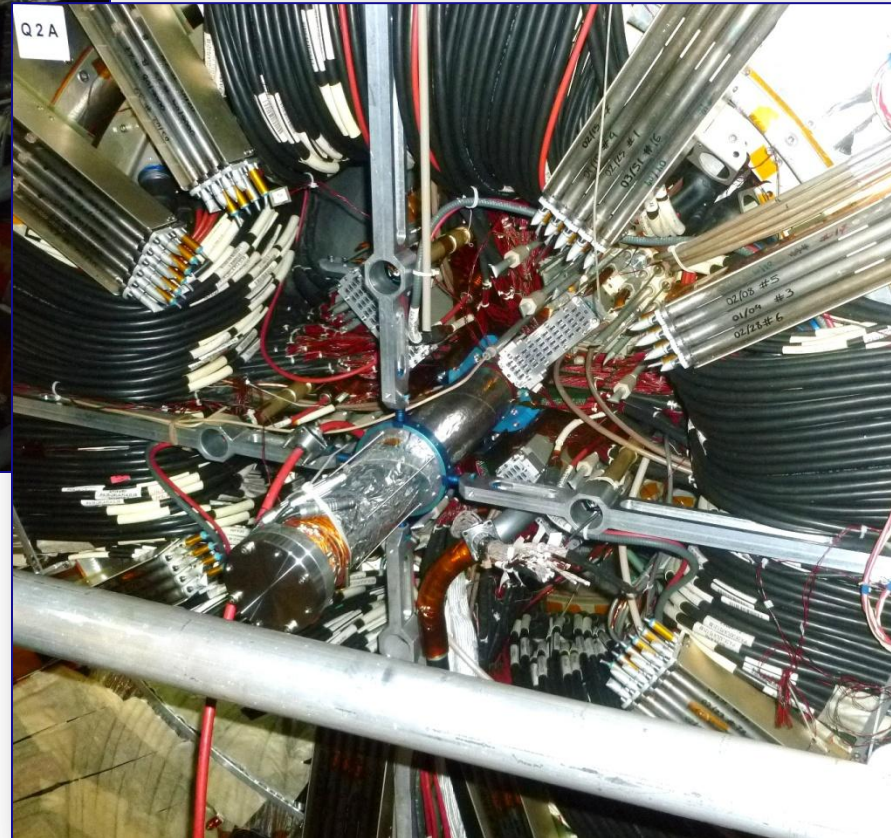
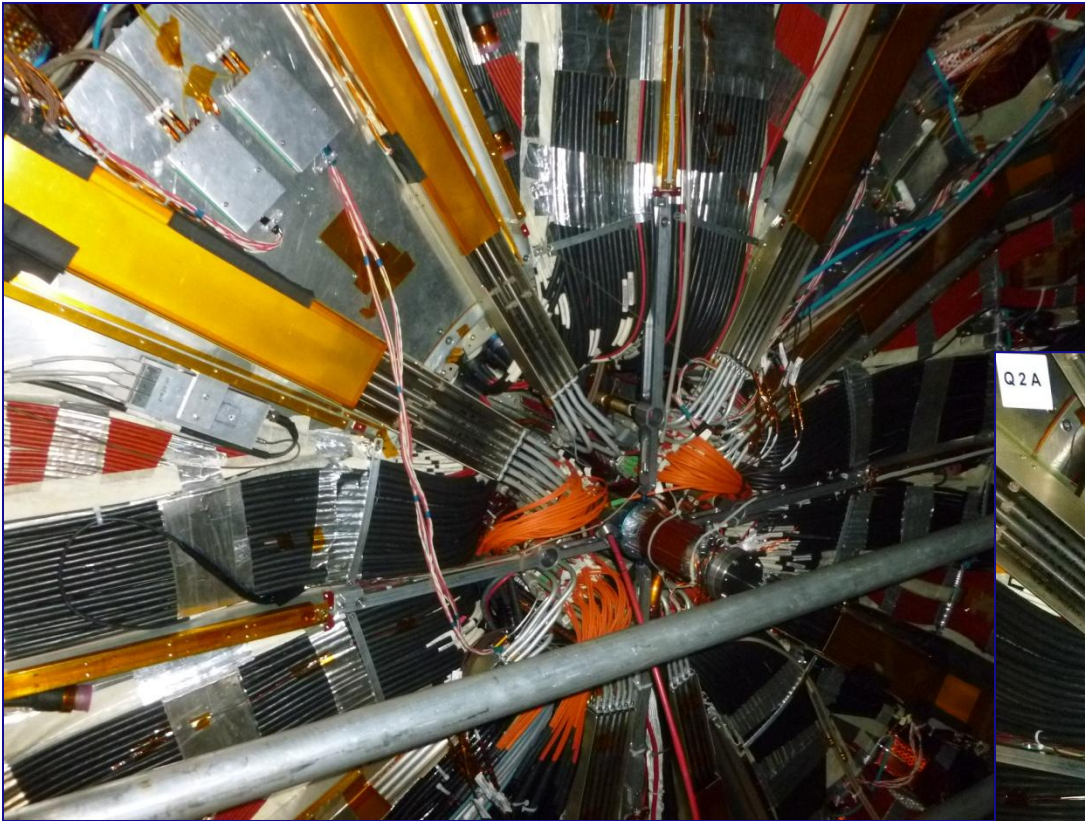
- ✓ Motivations to Pixel Detector on surface
 - 1. Physics and performance for b-tagging - Recovery of a significant amount of Pixel modules with n-SQP installation (up to 65 out of 88 bad links).
 - 2. Insertion risks and readiness of the IST (IBL Support Tube) installation with 2mm clearance.
- ✓ Pixel in SR1 from April 18th 2013 to April 1st 2014
- ✓ Pixel is one of the major ATLAS upgrade during LS1
 - Pixel detector moved on surface in a controlled area
 - New beam pipe
 - New 4th layer – IBL
 - Service panel exchange with new opto-boards in accessible position
 - Beam monitoring detector – DBM
 - New cooling – CO2 plant: 2 systems of 3.3kW each

Gruppi italiani non coinvolti direttamente nella de-reinstallazione dei pixel, se non per cambiamenti nei servizi (PP2) e crate in SR1. Faremo follow-up dei sistemi rilasciati (moduli, servizi) per IBL e impegno nel read-out comune in cui IBL+Pixel devono convergere.

Pixel deinstallation



March 19th: Day 1



Sensor Production: Final summary



Summary of Production 3D Wafers



Wafer	Produced & Tasted	Selected	UBM (by IZM)	Comment
FBK – A10	20	12	12	
FBK – A11	22	4	4	
FBK – A12	17	11+(2 broken)	10	2 broken in shipping
FBK – A13	11	4	-	
CNM1	18+1	16	16+1	18 wafer data sheets
CNM2	17	12	9	17 wafer data sheets
CNM3	15	12		
TOTAL:	121	71+(2 broken)	51+1	1 with 2 good tiles
		CNM	FBK	
Produced & tested wafers		51	70	
Selected wafers		40	31	
UBMed wafers		26	26	
Green tiles on Selected		203 + 13 (broken)	135	
Green tiles with UBM		133	Tot: 250	117

Values and table from G. Darbo

Feb,18, 2012, Trento

A. Gaudiello - Università degli Studi di Genova and INFN

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IST and IBL Installation in the pit



Conclusion

Operation	Risk description	Likelihood	Consequences	Remarks
Beam Pipe flange cutting		Rare	Minor	
LGT insertion		Rare	Minor	
PPo fasteners removal	One collar fasteners cannot be removed, loose of wires	Possible	Major	Two different scenarios weather the problem is on side A or C. More tests would give more confidence
VI extraction	Cannot control gap during extraction	Rare	Minor	
IST insertion	Cannot control the gap during the insertions, vibration of the system	Possible	Severe	IST insertion tests are going on to acquire more data and experience
New wire system installation	Miss control the displacement of wire during load taking, cannot grab a wire	Possible	Severe	Not tested. Tests are mandatory before doing the operation
LGT removal	LGT get stack	Rare	Minor	
IBL Insertion	IBL get stuck	Rare	Major	

R. Vuillermet