FDIRC prototype status
and
an update on tasks & schedule

J. Va'vra

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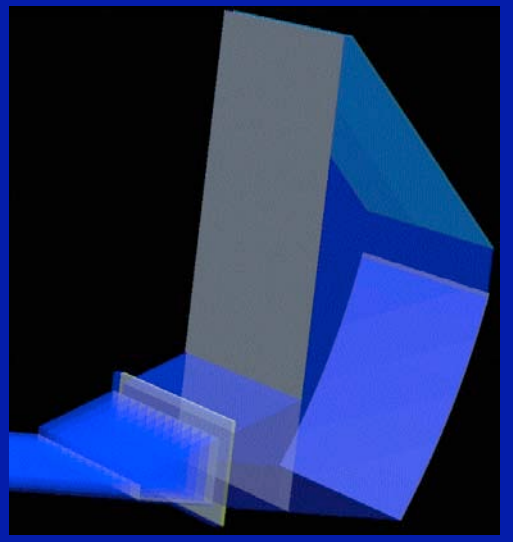
- **Status of optics.**
  - **FBLOCK & New Wedge (Cosmo optics)**
  - **Optical interfaces**
  - **Transmission, yellowing and radiation damage of quartz & glues.**
  - **Laser calibration for FDIRC.**
- **Status of detector preparation.**
  - **Detector support in the FDIRC prototype**
  - **Scanning setup to verify detectors**
- **Status of mechanics** (will leave it to Massimo & Nicola)
- **Update on FDIRC R&D tasks & schedule**

FBLOCK and New Wedge

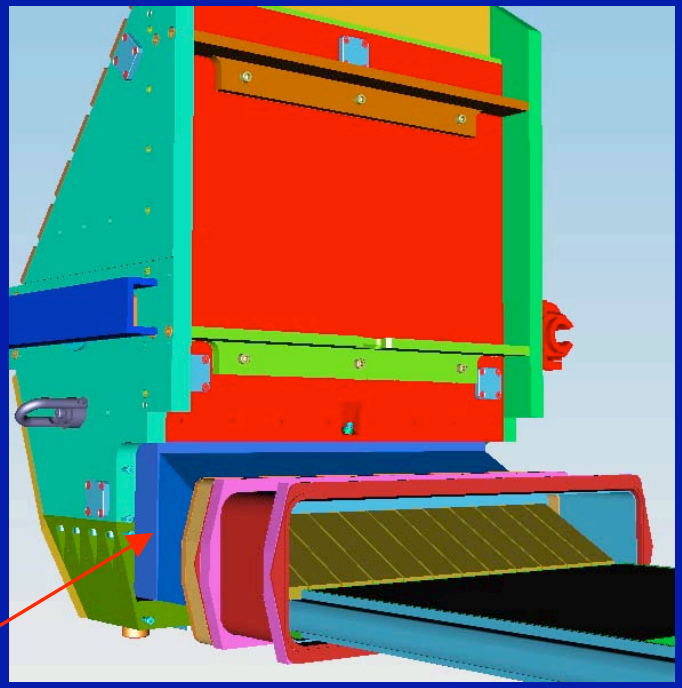
J. Va'vra

- **Cosmo optics is starting to cut the raw material now.**
- **I will visit them in the beginning of May. By that time they should be finishing the New Wedge.**
- **I received a coupon from a plating company, which will do FBLOCK aluminum plating. It has a protective SiO_2 layer. Planning to do tests with it. These should include resistance to (a) a sticky tape we use for gluing, (b) solvents and wet RTV, (c) rubbing by a nylon button, (d) some other mechanical tests ?**
- **Expect the New Wedge delivery in May.**
- **Expect the FBLOCK delivery in late June.**
- **At this point we have lost ~2 months.**



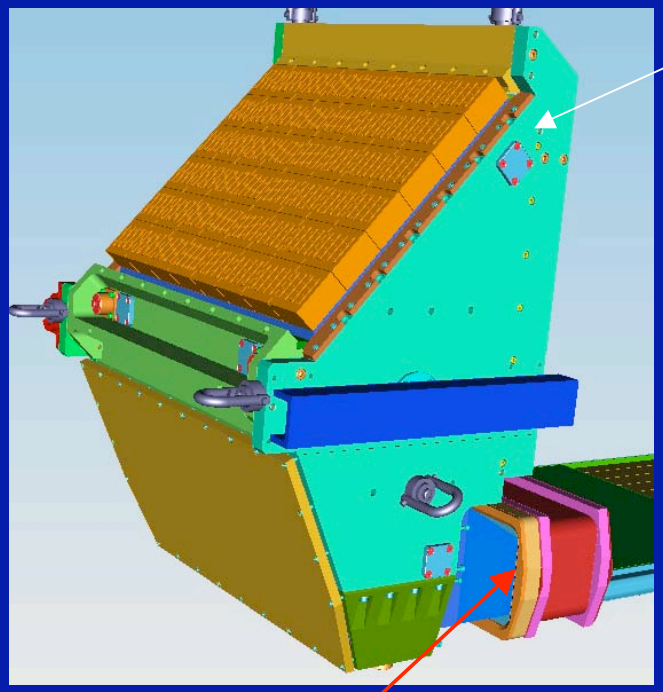
Optical coupling of large surfaces

M.McCulloch and J. Va'vra



RTV

Have to do this joint in situ. If we have to take things apart, we will cut it here. RTV coupling is less sensitive to alignment of two surfaces than the Epotek joint. Present aim is to have a glue thickness of 1 mm.



Massimo's Fbox design

Epotek-301-2

This joint will be done in the clean room first. We can do a better alignment there. We do not want to do an RTV joint here out of fear that the EPDM gasket will poison it. Also it would be very difficult to make a dam for RTV. Present aim is to have a glue thickness of ~1 mil.

- **Present thinking is to make the bar box window-to-Wedge coupling using the Epotek-301-2 epoxy, and Wedge-to-FBLOCK coupling using an RTV.**

What to consider when doing optical coupling

- **One has to develop a methodology how to do it.**
- **Glue transmission and its sensitivity to photon flux and radiation. This study is in full progress and will be reported on in Elba.**
- **Poisoning of glue effects by other materials. This applies especially to RTVs as they are very sensitive to this. For example, they will not cure in a presence of EPDM gasket, which was used to seal bar boxes. That is the main reason we do not want to use the wet RTV on the bar box-to-Wedge interface. Summary of other RTV compatibility tests:**

  1) Rhodorsil 141:

  good: pink tape, polyethylene tape, polupropylene cups, vinyl gloves, viton, syringes);

  bad: EPDM gasket, blue nitrogloves, Buna rubber, sulphur, organo-tin rubber products)

  2) Shin-Etsu SES 403:

  good: vinyl gloves, acrylic tape, polyethylene, pink tape, syringe, viton; **bad:** EPDM gasket, blue nitrogloves;

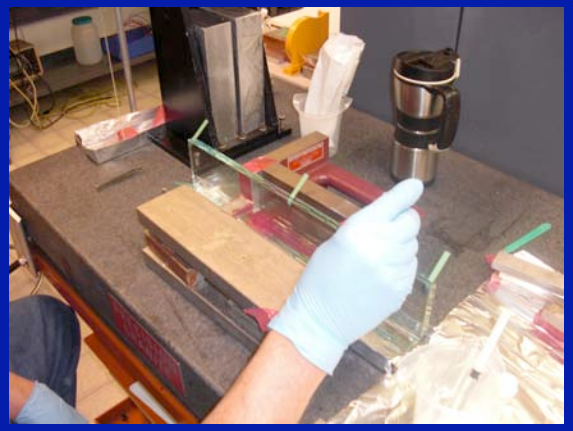
- **How to take the optical pieces apart if we have to ? We have developed a good method: round s.s. wire saw. It cuts it very easily as a rasor blade.**
- **Long-term stability of glue adhesion under the mechanical stress. We can create possible stresses when inserting the FDIRC into the magnet from its gluing position, which is outside of the magnet. This has to be (a) tested and (b) carefully analyzed. Shin-Etsu 403 RTV adheres to glass much better than Rhodorsil 141. Not easy to clean 403 from the surface.**

Optical coupling of large surfaces

M.McCulloch and J. Va'vra

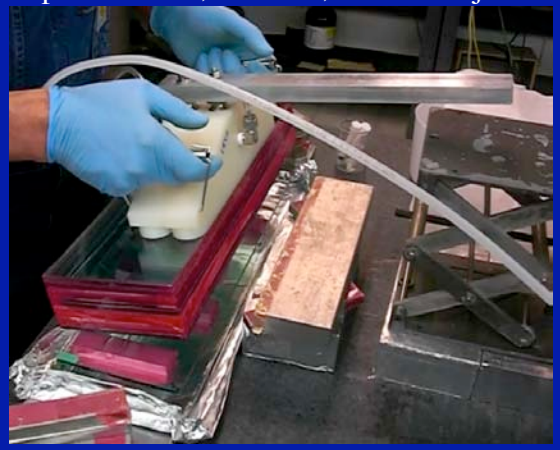
Gluing test #7a:

Epotek-301-2, start with 3 mils engineered gap, vertical joint



Gluing test #6:

Epotek-301-2, 1-2 mils, horizontal joint



Gluing test #19:

Shin-Etsu SES-403 RTV, 1 mm, vertical inclined joint

Gluing test #15:

Rhodorsil 141 RTV, 2 mm, vertical joint

List of various tests with optical glues

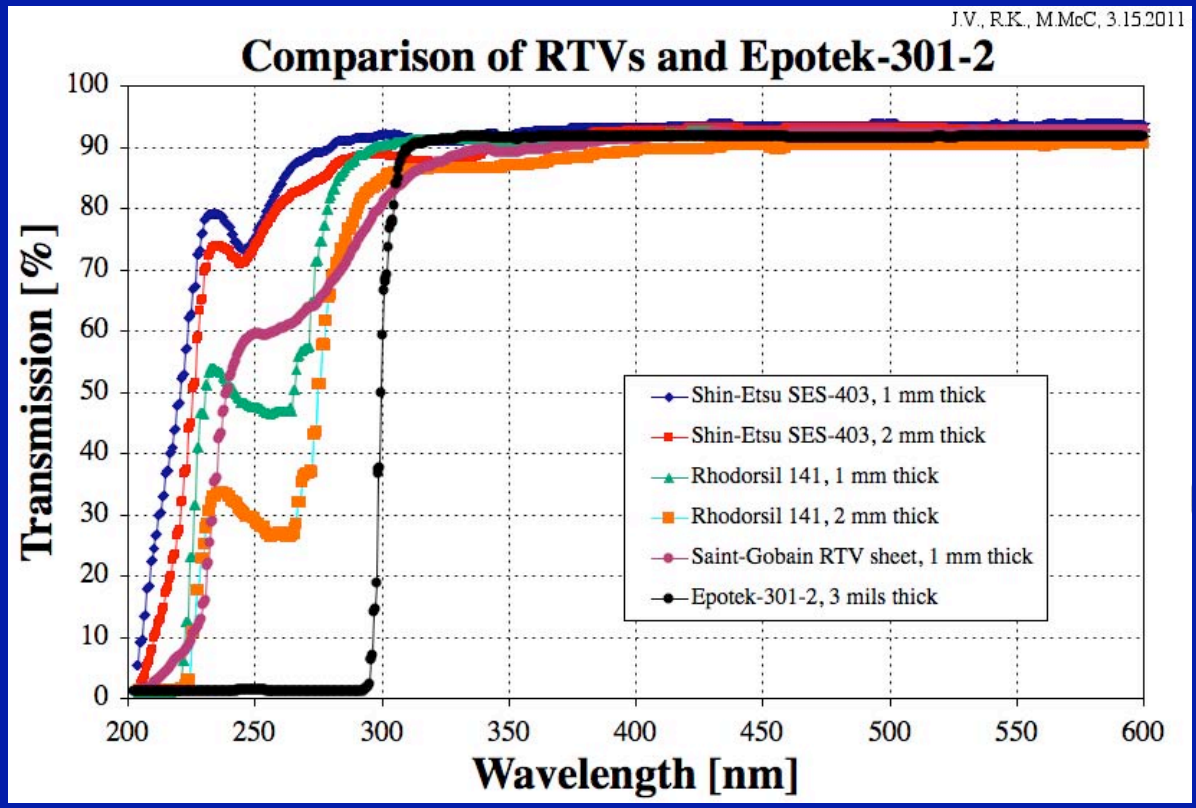
M.McCulloch and J. Va'vra

Test	Glue type	Glue thickness	Orientation	Result
7a,b	Epotek 301-2	3 mils -> ~1 mils	Vertical, horiz.&inclined	Bubbles, bad
8	Epotek 301-2	Vary: 3 mils -> ~1 mils	Vertical, horiz.	Very acceptable
9	Epotek 301-2	3 mils -> ~1 mils	Vertical, horiz.	A few bubbles, very good
10	Epotek 301-2	Vary: 3 mils -> ~1 mils	Vertical, horiz.	A lot of bubbles, very bad
11	Epotek 301-2	3 mils -> ~1 mils	Vertical, horiz.	few bubbles, ~15mm^2 area
12	Rhodorsil 141	2 1/4 mm	Vertical, horiz.	Perfect
13	Rhodorsil 141	1 mm	Vertical, horiz.	Perfect
14	Rhodorsil 141	Vary: 0.5-1.5 mm	Microscope slides	Perfect
15	Rhodorsil 141	0.5-1 mm, assym.	Vertical, inclined	Perfect
16	Shin-Etsu 403	1 mm	Vertical, horiz.	Perfect
17	Shin-Etsu 403	1.5 mm	Vertical, inclined	Perfect
18	Rhodorsil 141	1.5 mm	Vertical, inclined	Perfect
19	Shin-Etsu 403	1 mm	Vertical, inclined	Perfect

- **We feel much better to do this job, now that there has been so many tests.**
- **But we certainly do not want to underestimate it.**

Transmission at incident angle of 90^{o} for various optical glues

J. Va'vra, B. Kirby and M.McCulloch

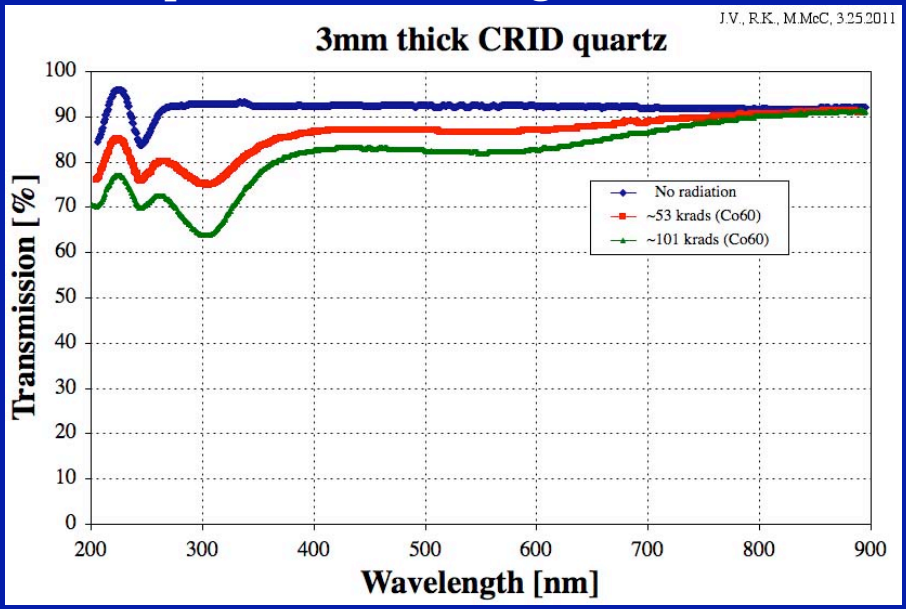


- **The Epotek-301-2 epoxy is our anchor reference.**
- **1mm-thick RTV samples (Rhodorsil 141 & Shin-Etsu SES-403) are very transparent. 2mm-thick RTV samples begin to have a slight problem.**
- **1mm-thick Saint-Gobain RTV sheet has some loss below ~350nm.**

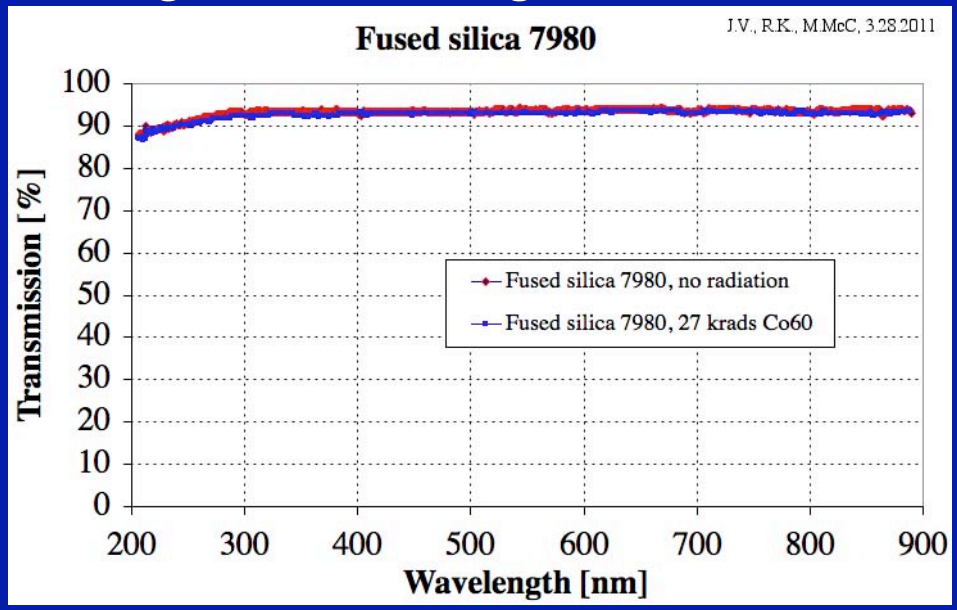
The radiation study with Co^{60}

J. Va'vra

CRID quartz would not be good substrate:



Corning Fused silica 7980 good so far:



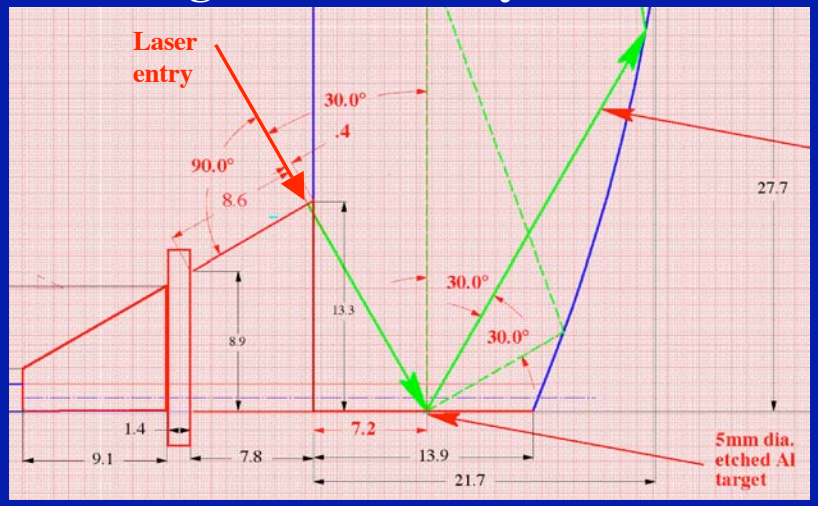
(Tests are in progress)

- **Use Corning 7980 Fused silica as substrate for glue tests.**
- **Tests of glues are in progress. We want to weed out bad glue candidates.**
- **Results will be presented in Elba.**

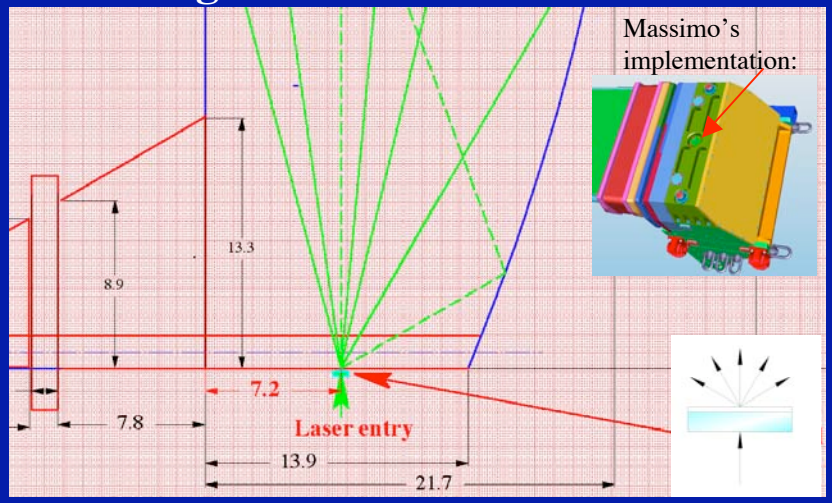
New fiber entry design

J. Va'vra

Old design of laser entry :



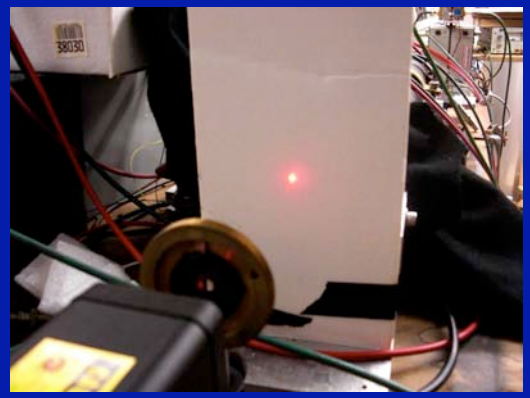
New design with a diffuser:



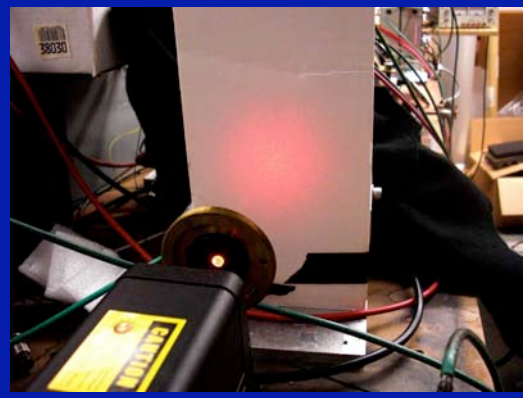
Diffuser

- **Want to have a very small footprint not to lose real Cherenkov photons.**
- **Abandoned the old light entry design as the laser light was going through the glue joint at steep angle. Instead, will glue a 5mm dia. glass diffuser at the bottom of FBLOCK.**
- **Old MC simulation results by Doug Rogers applies to the new design, as the light source is in the same position.**

Laser spot with no diffuser:



Laser spot with no diffuser:

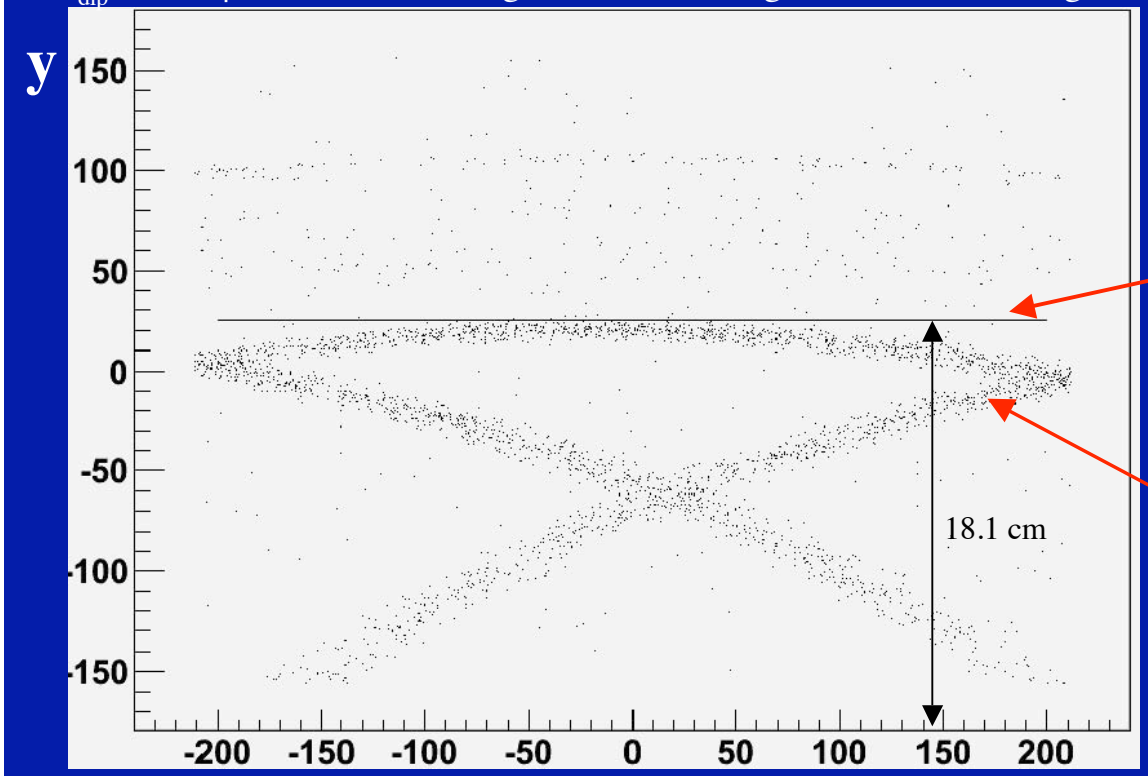


(Screen is 13 cm away; ~3" dia. spot)

Detector layout: Ray tracing vs. MC

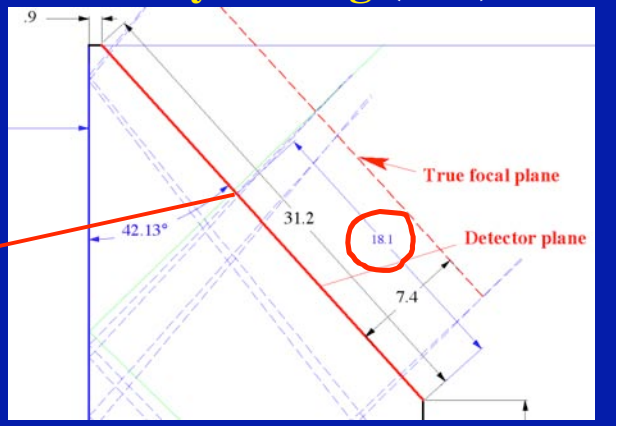
D. Roberts and J. Va'vra

$\theta_{dip} = 90^o$, $\phi = 90^o$, bar #6, magnet off, no timing cut, no micro-wedge, 4 GeV/c:



MC
(D. Roberts)

Ray tracing (J.V.):



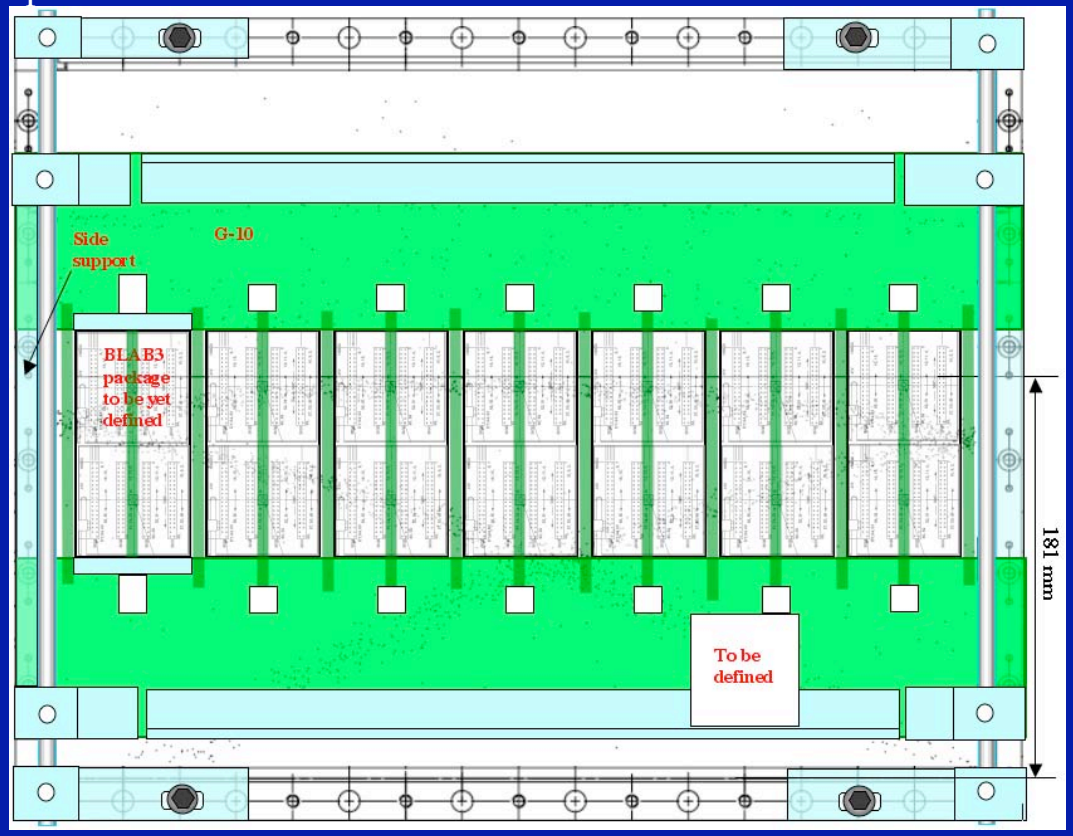
(detector plane)

- **The image I showed in the last meeting was upside down !!**
- **Ray tracing does not have any glue interfaces in the camera optics.**
- **MC has a glue model of Epotek-301-2 in two interfaces.**
- **Final glue thickness will be known after we actually do it.**

Initial detector layout for 2011-12 period

J.Va'vra with input from G. Varner, D. Roberts, M. Benettoni, M. McCulloch

Present plan:



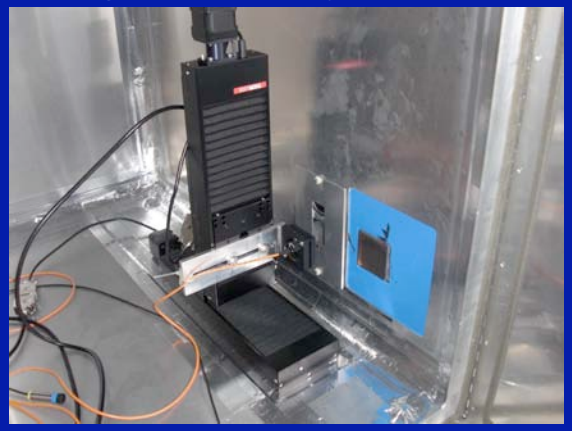
We used a similar concept in the 1-st FDIRC prototype:

- **The design assumes seven BLAB3 double-packages right now.**
- **G-10 plane is made of two parts. It will be movable.**
- **One empty extra slots for new detectors/electronics - to be defined.**

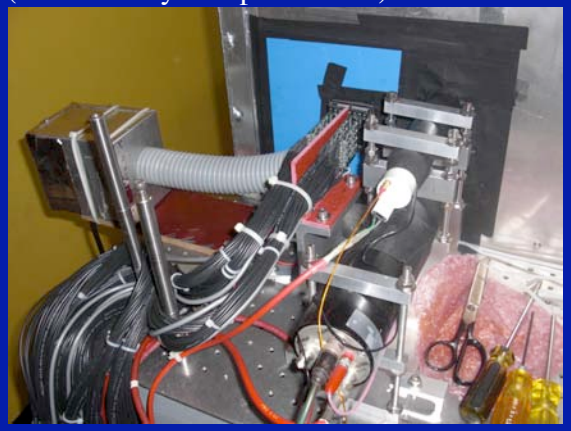
Restart of SLAC scanning setup

J. Benitez, K. Nishimura, D. Aston, J. Va'vra, M. McCulloch

New stage controlled by Windows:



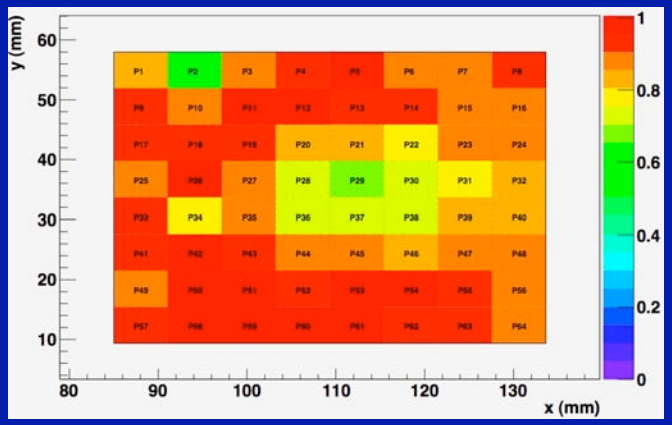
New 40x amplifiers:
(SLAC/Maryland production)



PiLas laser (407nm):

The new UNIX μ-PCi computer:
(with fiber interface for BLAB3 electronics)

Scan of the 1-st H-8500 MaPMT:
(normalized to Photonis PMT's QE)



Plan for next month:

- Scan all 14 H-8500 tubes for FDIRC
(a single point per pixel)

- Electronics presently used:

(a) SLAC/Maryland 40x amplifiers & LeCroy Disc 4413/ TDC 3377

Later on this year we may switch to:

(b) SLAC CFD/Phillips TDC 7186

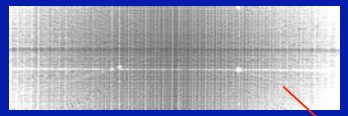
(c) BLAB3 electronics

In 2012 we will switch to:

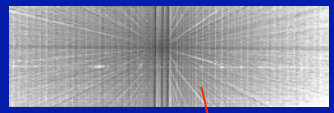
(d) LAL electronics and will do detailed scans.

Bar quality in spare bar box #0

Bar #2 (best bar):



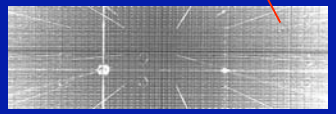
Bar #6 (want to start with):



Summary of defects in the bar box #0 (our very first bar box produced):

Wedge end											
Bar number	Wedge	Gap: Wedge - A	Quartz segment A	Gap: A - B	Quartz segment B	Gap: B - C	Quartz segment C	Gap: C - D	Quartz segment D	Gap: D - Mirror	Total damage
1	Chipy corner (~20mm^2)		no lobes		no lobes		no lobes		no lobes		~20mm^2
2			no lobes		no lobes		no lobes		no lobes	chip	
3	Chipy corner (~5mm^2)		no lobes		no lobes		no lobes		no lobes		~5mm^2
4	Chipy corner (~5mm^2)		no lobes		no lobes		no lobes		no lobes		~5mm^2
5	Chipy corner (~5mm^2)		no lobes		no lobes, poor edge quality	Bubble (~10mm^2)	no lobes, poor edge quality		no lobes, poor edge quality		~15mm^2
6		Bubble (~2mm^2)	no lobes		no lobes, poor edge quality		no lobes		no lobes, crystaliz. (<100mm^2)		<100mm^2
7	Chipy corner (~5mm^2)		lobes, poor edges		lobes		lobes		lobes	a medium chip (<20mm^2)	<25mm^2
8	Chipy edge (~50mm^2)	Bubble (~2mm^2)	lobes, poor edges		lobes		lobes	chipy end (~10mm^2)			~62mm^2
9		Bubble & chip (~10mm^2)	no lobes	Chipy end	lobes		lobes		lobes		~10mm^2
10			lobes, poor edges		lobes		lobes, poor edges, chip		lobes		
11	Chipy corner (~5mm^2)	Bubble (~5mm^2)	lobes, poor edges		lobes		lobes	Bubble & chip (~15mm^2)	huge chip (~1500mm^2;top)		~1525mm^2
12	Chipy corner (~3mm^2)	Bubble (~10mm^2)	lobes, poor edges		lobes		lobes		lobes		~13mm^2

Bar #11 (worst bar):



- **<u>We plan to use this particular bar box in CRT tests.</u>**
- **This bar box is perfectly good bar box, except it was our very first one and we used bars with lobes and some damages (chips, poor edges, etc.).**
- **We can avoid certain sections by placing the start counter appropriately.**
- **We do not want to use a good bar box from BaBar as we will be doing gluing for the first time, and we do not want to risk of damaging the good bar box.**

Updated on FDIRC prototype tasks for a period before TDR

Comments:

- Only a few new additions since the PID meeting two weeks ago
- The schedule is behind the original schedule by ~2 months.
- Still plenty of opportunity for people to join.
- Multiple work by different institutions welcomed as it will provoke discussions.

FDIRC tasks for 2011

	Tasks for FDIRC prototype test in CRT	Present list of institutions	People	Time to start	Time to finish	Range [days]	Comment	Critical items at present
2	**I. FDIRC optics:**							
3	**a) Mechanical support structures**							
4	Mechanical design of Fbox	Padova, SLAC, Bari	MB, JV, NM, MMcC	15-Jan-11	5-May-11	110	in progress	
5	Machining of Fbox parts	Bari & Padova	MB, NM	5-May-11	5-Jun-11	31		
6	Mechanical design of Fbox support in CRT	Bari, Padova, SLAC	NM, MB, JV, MMcC	15-Jan-11	5-May-11	110	in progress	
7	Machining of Fbox support for CRT	Bari & Padova	MB, NM	5-May-11	30-May-11	25		
8	3D dummy model of the New wedge & FBLOCK	Bari, Padova, SLAC	MB, NM	1-Mar-11	25-Apr-11	55	in progress	
9	Careful chemical cleaning (etching) of Fbox parts	Bari & Padova	MB, NM	1-Jun-11	10-Jun-11	9		
10	Trial assembly of Fbox & 3D dummy, possible modifications, itterate	Bari & Padova	MB, NM	10-Jun-11	15-Jun-11	5		
11	Sending Fbox, support and 3D dummy model to SLAC	Bari & Padova	MB, NM	1-Jul-11	5-Jul-11	4		
12	Trial assembly of Fbox at SLAC, possible modification, itterate	SLAC	MMcC, JV	5-Jul-11	15-Jul-11	10		
13	**b) Quartz optics (FBLOCK, New Wedge, coupons)**		MB, NM					
14	Optical design (ray tracing) and verification by MC	SLAC, Maryland	JV, DR		15-Jan-11		finished	
15	Raw quartz material procurement and delivery	SLAC	Corning, JV	15-Oct-10	10-Jan-11	87	finished	
16	Quartz machining and polishing of FBLOCK & New Wedge	SLAC	Cosmo optics, JV	25-Mar-11	25-Jun-11	92	in progress	
17	Delivery of the New Wedge to SLAC	Cosmo	Fedex	15-May-11				
18	QC of New Wedge at SLAC; compare them with Cosmo data	SLAC	QC, Cosmo, MMcC, JV	15-May-11	25-May-11	10		
19	Delivery of FBLOCK to SLAC	Cosmo	Fedex	1-Jul-11				
20	Mechanical QC of FBLOCK at SLAC; compare them with Cosmo data	SLAC	QC, Cosmo, MMcC, JV	1-Jul-11	15-Jul-11	14		
21	Simple optical tests of FBLOCK with a laser (look for lobes, etc.)	SLAC	JV	14-Jul-11	15-Jul-11	1		
22	Optical coupling between bar box window and New Wedge (Epotek)	SLAC	MMcC, JV	20-Jun-11	25-Jun-11	5		
23	Measure the diffuser position with a laser and proper optical interfaces	SLAC	JV, MMcC	20-Jul-11	22-Jul-11	2		
24	Glue laser light diffuser to the bottom of the FBLOCK	SLAC	MMcC, JV	20-Jun-11	22-Jun-11	2		
25	Assembly of Fbox around FBLOCK & New Wedge	SLAC, Bari, Padova	MMcC, JV, MB, NM	20-Jul-11	1-Aug-11	12		
26	Installation of the laser lens and fiber connector	SLAC	MMcC, JV	15-Aug-11	20-Aug-11	5		
27	FBLOCK & Fbox assembly finished in the clean room	SLAC	MMcC, JV	30-Aug-11				
28	**c) Final integration in CRT**							
29	Removal of the present FDIRC prototype from CRT	SLAC	MMcC, riggers, JV	15-May-10	17-May-10	2		
30	Installation of bar box support base for the new bar box	SLAC	MMcC, riggers, JV	18-May-10	20-May-10	2		
31	QC the bar box base before bringing the bar box	SLAC	MMcC,alignment, JV	20-May-10	30-May-10	10		
32	Install the bar box #0 on the CRT base	SLAC	MMcC, riggers, JV	1-May-10	10-May-10	9		
33	Install the Fbox support to the CRT base	SLAC, Bari, Padova	MMcC, JV, MB, NM	1-Jul-10	15-Jul-10	14		
34	Trial fit of Fbox & dummy & bar box in CRT - adjust alignment	SLAC, Padova, Bari	MMcC, MB, JV, NM	20-Jun-11	30-Jun-11	10		
35	Bring Fbox with the real FBLOCK & New Wedge to CRT	SLAC, Padova, Bari	MMcC, riggers, JV, NM	15-Aug-11	25-Aug-11	10		
36	Optical coupling between the FBLOCK & New Wedge (RTV ?)	SLAC, Padova, Bari	MMcC, JV, MB, NM	25-Jul-11	31-Aug-11	37		
37	Gas sealing of Fbox and bar box, install the N2 boil-off gas flow	SLAC	MMcC	1-Aug-11	5-Aug-11	4		
38	Install the N2 boil-off gas flow	SLAC	MMcC	5-Sep-11	7-Sep-11	2		
39	Install the mechanical enclosure and establish the light seal	SLAC	MMcC, JV	10-Sep-11	12-Sep-11	2		
40	Install detectors with their initial electronics - see more later	SLAC, Hawaii	GV, JV, KN	10-Sep-11	25-Sep-11	15		
41	**d) Other tests/actions which need to be done relatively soon**							
42	R&D on optical coupling between large area glass surfaces (Epotek & RTV)	SLAC	MMcC, JV	10-Jan-11	20-Mar-11	69	in progress	
43	Make a diffuser for the laser calibration, and test it	SLAC	MMcC, JV	25-Mar-11	1-Apr-11	7	in progress	
44	Order mirror coupons from the plating company	SLAC	JV	10-Mar-11	24-Mar-11		finished	
45	Evaluation of mirror coupons for FBLOCK coating - hardness tests	SLAC	MMcC	5-Mar-11	25-Jun-11			
46	Evaluation of mirror coupons for FBLOCK coating - radiation sensitivity	SLAC	JV	20-Feb-11	20-May-11	89		
47	Find a new place to do optical transmission tests	SLAC	JV		28-Feb-11		finished	
48	Create a glue test samples for "yellowing & radiation" tests	SLAC	MMcC, JV	15-Feb-11	25-Mar-11	38	finished	
49	UV light exposure of glue samples	SLAC	JV	15-Mar-11	15-Apr-11	31	in progress	
50	Radiation tests of glue samples	SLAC	JV	15-Mar-11	15-Apr-11	31	in progress	
51	Tests of optical coupling between detectors and FBLOCK (Grease ? RTV ?)	SLAC, Padova, Bari	MMcC, JV, MB, NM				in progress	
52	Measure refraction index of RTV used for coupling between Wedge & FBLOCK							
53	Optical distortions in RTV coupling between Wedge and FBLOCK							
54	Measure various distortions and errors in the FDIRC prototype	SLAC	alignment, MMcC, JV					
55								

FDIRC tasks for 2011-12

	Tasks for FDIRC prototype test in CRT	Present list of institutions	People	Time to start	Time to finish	Range [days]	Comment	Critical items at present
57	**II. Detector installation:**							
58	**a) Plan for the 2011:**							
59	Design of a temporary detector patern on a focal plane	SLAC, Maryland, Hawaii	JV, DR, GV	1-Mar-11	15-Apr-11	45	in progress	
60	Make a temporary detector & electronics G-10 holder design for 14 detectors	SLAC	MMcC	25-May-11	15-Jun-11	21		
61	Temporary HV power supplies and HV distribution for 14 detectors	SLAC	JV	12-Aug-11	15-Aug-11	3		
62	Temporary HV cables and fiber for 14 detectors for initial testing	SLAC	JV	15-Aug-11	20-Aug-11	5		
63	**b) Plan for the 2012 :**							
64	Final motherboard development for 48 detectors (resp. 8x6 detectors)	LAL, Padova, Bari, SLAC	CB					
65	Final mechanics to hold the motherboard on the FBLOCK/Fbox	Padova, Bari, LAL, SLAC	MB, NM, MMcC, JV					
66	Final HV power supplies and HV distribution							
67	Final cables and fiber links							
68	Include other possible detectors in spare slots (for example G-APDs ?)	Padova	GS					
69								
70	**III. Electronics installation:**							
71	**a) Plan for the 2011:**							
72	BLAB3 electronics	Hawaii	GV, KN		15-Jun-11		in progress	
73	Install BLAB3 modules, fiber connections,	SLAC, Hawaii	MMcC, JV, GV, KN	12-Oct-11	15-Oct-11	3		
74	Temporary electronics cooling	SLAC, Hawaii	MMcC, JV, GV	15-Oct-11	20-Oct-11	5		
75	Initial debugging of FDIRC operation	Hawaii, SLAC	GV, KN, JV	15-Oct-11	30-Nov-11	46		
76	First attempt to take data	Hawaii, SLAC	GV, KN, JV	30-Oct-11	15-Dec-11	46		
77	t0 time for CRT telescope using Start Quartz counter	SLAC	JV				finished	
78	**b) Plan for the 2012:**							
79	Final motherboard	LAL, Padova	CB, MB					
80	Final TDC/ADC electronics available in 2012	LAL	CB, HL, VT, DB					
81	Install the electronics	LAL	CB, HL, VT, DB					
82	Final mechanics of the electronics cooling	LAL, Padova, Bari, SLAC	CB, MB, NM, MMcC, JV					
83	Initial debugging of FDIRC operation	LAL	CB, HL, VT, DB					
84	First attempt to take data	LAL, SLAC						
85								
86	**IV. Characterization of H-8500 detectors:**							
87	**a) Scanning setups:**							
88	Scanning setup hardware and associated software development	Trieste ??	?				plan	
89	Scanning setup hardware and associated software development	Bari	NM,FG, FG				in progress	
90	Scanning setup hardware and associated software development	Maryland	DR, ...				in progress	
91	Scanning setup hardware and associated software development	SLAC, Hawaii	KN, JB, JV, MC, DA	10-Feb-11	15-Mar-11	33	in progress	
92	**Topics to study in the scanning setup:**							
93	A simple measurement of the 2D efficiency normalized to Quantacon PMT	SLAC, Hawaii	KN, JB, JV, MC, DA	20-Mar-11	30-Jun-11	102	in progress	
94	Deatiled measurement of the 2D efficiency rnormalized to Quantacon PMT							
95	Measurement of the 2D TTS resolutions							
96	Measurement of single pe spectra in center of each pad							
97	Measurement of cross-talk							
98	Charge sharing between pads and its use to improve the resolution							
99	Performance of the final electronics on the detectors							
100	Search for problems in detectors and electronics							
101	**b) Other special setups or problems to solve:**							
102	Rate effects of H-8500 tubes							
103	Cathode aging effects of H-8500 tubes							
104	Radiation damage of the electronics							
105	Magnetic field sensitivity of H-8500 tubes							
106	Design of a necessary magnetic shielding for H-8500							
107	Desing of a background shielding for FBLOCK, H-8500 and its electronics							
108	t0 time: its origin and its distribution within SuperB							
109	Systematic study of glue scattering at large incident angles							
110								

FDIRC tasks for 2011-12

	Tasks for FDIRC prototype test in CRT	Present list of institutions	People	Time to start	Time to finish	Range [days]	Comment	Critical items at present
112	**V. DAQ operation:**							
113	DAQ software	Hawaii	KN	15-Apr-11	20-Jun-11	66	in progress	
114	DST production	Hawaii	KN	15-Apr-11	20-Aug-11	127		
115	Hardware maintenance	SLAC	JV				ongoing	
116								
117	**VI. Laser calibration:**							
118	Laser optics design using ray tracing and MC simulation	SLAC, Maryland	JV, DR	15-Feb-11	20-Jun-11	125	finished	
119	Laser calibration system implementation (laser, fibers, lens holder, diffuser)	SLAC, Padova, Maryland	JV, MB, DR	15-Apr-11	20-Sep-11	158	in progress	
120								
121	**VII. CRT maintenance:**							
122	Fix hodoscope's dead channels	SLAC	JV, MMcC					
123	Add more absorber (lead)	SLAC	MMcC, JV					
124	Add a precise small hodoscope to get a local ~1mm x-y resolution ??	SLAC	JV, MMcC	15-Mar-12				
125	Software maintenance	SLAC, Hawaii	KN, DA					
126								
127	**VIII. FDIRC software development:**							
128	Optimum detector layout on FBLOCK (MC study, ray tracing)	Maryland, SLAC	DR, JV	10-Feb-11	25-Mar-11	43	finished	
129	Effect of various errors on the Cherenkov angle resolution (MC study)	Maryland, SLAC	DR, JV				in progress	
130	CRT DAQ software upgrades for the new electronics	Hawaii	KN	15-Jun-11			a guess	
131	DST file production	Hawaii	KN	15-Jun-11			a guess	
132	Data analysis of data from FDIRC in CRT	Bari, SLAC	NM	15-Aug-11			a guess	
133	MC simulation of kx,ky,kz and TOP pixel constants for each bar			15-Apr-11			a guess	
134	Cherenkov angle resolution as a function of various CRT variables			15-Oct-11			a guess	
135	Timing resolution using the electronics calibration			15-Sep-11			a guess	
136	Timing resolution of the CRT start counter (t0 of the system)	SLAC	JV	15-Sep-11			a guess	
137	Timing resolution of FDIRC detectors using laser calibration			15-Oct-11			a guess	
138	Timing resolution of FDIRC detectors using CRT tracks			15-Nov-11			a guess	
139	Chromatic correction studies in the CRT setup			15-Feb-12			a guess	
140	Investigate various systematic efects (bar-to-bar variations, drifts, etc.)			15-Mar-12			a guess	
141	Development of PID algorithms for CRT tests (max. likelihood, etc.)			15-Apr-12			a guess	
142	Background study of FDIRC using a spreadsheet type of calculation	SLAC	JV	5-Feb-11			in progress	
143	Background MC studies of FDIRC in FullSim	LAL	LB	5-Feb-11			in progress	
144	Implementation of the FDIRC quartz optical model in FullSim	Maryland	DR, AS	5-Feb-11			in progress	
145	Further optimization of FDIRC optics			15-Feb-11			a guess	
146								
147	**IX. Names**							
148	JV - Jerry Vavra	SLAC						
149	NA - Nicolas Arnaud	LAL						
150	DR - Doug Roberts	Maryland						
151	MB - Massimo Benettoni	Padova						
152	NM - Nicola Mazziotta	Bari						
153	KN - Kurtis Nishimura	Hawaii						
154	DB - Dominique Breton	LAL						
155	CB - Christphe Beigbeder	LAL						
156	DA - Dave Aston	SLAC						
157	MC - Mark Convery	SLAC						
158	GV - Gary Varner	Hawaii						
159	MMcC - Matt McCulloch	SLAC						
160	FG - Fabio Gargano	Bari						
161	JB - Jose Benitez	SLAC						
162	GS - Gabriele Simi	Padova						
163	AM - Arafat Mokhtar	SLAC						
164								
165								