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01.01	**Spring Loading the Quartz Bar**	01: Design

Discussion regarding the loading of the quartz bar and potential need for a machined PEEK block to interface the mirror to the loading springs at the forward end of the QBB.

PEEK block may extend above and below the mirror (2mm). Testing will be required to determine if there are any optical effects from the PEEK contacting the non-mirrored quartz surfaces..

How is the gas seal formed at the forward end of the QBB? (silicone RTV)

Consider: Adding a counter-bore in the PEEK block—it will help keeping the spring located relative to the block.

Consider: Contacting mirror vendors and requesting recommendations regarding contacting the mirror with the PEEK block.

OBS: Spring compression will be done after the prism is captured at the backward-end of the QBB

OBS: 4 Spring contacts chosen in order to maintain consistency with the ECL Flange (this is where there is space available for the cover panels)

OBS: The glue to mount the PEEK buttons will be **Araldite 2011**

21.01	**QBB: EC and CDC side panels (honey-comb aluminum panels)**	21: QBB

Discussion regarding the full-length thickness of the honeycomb panels.

Consider: Increasing the thickness in the regions available to accommodate thicker EC and CDC side honeycomb panels of the QBB in order to increase the mechanical stiffness of the panels. Current estimate is that the Quartz Bar can tolerate only 7mm deflection before failure; current (modeled?) deviation of the QB is 3mm.

23.01	**Quartz Bar Box: Button Mounting**	23: Construction

Discussion about attaching the PEEK buttons to the EC and CDC Quartz Bar box honeycomb panels. Concern expressed about the potential of the surface tension effects of the epoxy used to attach the PEEK buttons to the QBB honeycomb panel surface may allow the PEEK buttons to be pulled away from the flat granite surface of the calibration slab. If this occurs, the PEEK buttons will not be flat but rather follow the contour of EC/CDC QBB panel; optical flatness criteria will be exceeded.

Action 23.01.01: Evaluate the process currently planned to attach the PEEK buttons to the QBB panels and determine if this is going to impact the design of the QBB such that the maximum deflection of the quartz will exceed 0.05mm.

ACTION ITEM	
23.01.01	Due Date:
Responsibility	
Organization	Individual
KEK	Suzuki
-	-
-	-
-	-
Description	

21.02	**Elastic Deformation of QBB Buttons, Epoxy Joint Concerns**	21: QBB

Action 21.02.01: Provide iTOP collaborators the deformation data for the PEEK QBB buttons under load. The compression deformation data from 0.02mm to 0mm is of most interest.

Action 21.02.02: Engineering Analysis of the epoxy joint of the QBB buttons and the QBB skin. What is the stress on the quartz bar relative to the compliance of the buttons and their location on the panels. We need to understand what the local stress is on the quartz and how this will affect the detector performance. Document the acceptable level in the ICD. Must be assessed for case of different thicknesses of each optic within tolerance of +-0.1 mm (KEK, PNNL)

ACTION ITEM	
21.02.01	Due Date:
Responsibility	
Organization	Individual
KEK	Suzuki
-	-
-	-
-	-
Description	

ACTION ITEM	
21.02.02	Due Date:
Responsibility	
Organization	Individual
KEK	Suzuki
PNNL	Fast
-	-
-	-
Description	

07.01	**Front Board Signal Routing Discussion**	07: PMT/PC Mount

Discussion regarding the circuit trace routing and PMT pins used for the Front board. From the PNNL design, there is value in deleting the Mill-Max lands and replace them with gold-plated lands on the PC Board surface directly. In addition, increasing the board thickness will allow the PMT sockets to be inserted in the PC board in blind holes (not through holes) leaving the backward side of the front board fully available for pogo-pin landing points.

OBS: PMT sockets are press-insert (not soldered) and are open-bottom (not closed sockets)

OBS: PMT pin lengths are sufficiently consistent to enable the design of a PC board that will accommodate the full length of the PMT pin.

OBS: A simple go/no-go gauge can be used to ensure no over-length pins on any PMTs.

ACTION 07.01: Nagoya to add pin length go/no-go test to PMT acceptance test process.

08.01	**HV Connectors and Experiment Services**	08: HV Supply

Belle II Meeting: We may want/need to bring this topic up to the larger Belle II meeting.

OBS: Direct-soldering the HV cable to the HV PC Board may require that a fixture be fabricated to pre-bend the HV cable in directions and at radii that are consistent with the needs of the QBB electronics box and installation.

ACTION 08.01: Capture the HV Levels in the ICD (data is available in G Visser's presentation)

OBS: The HV Board needs to be redesigned so that the overall board length is shorter and will fit in the QBB electronics box.

OBS: The HV Board may be able to be shortened to 82mm in length (current design is 102mm), but this will require the board be encapsulated (potted)…this will have additional benefit as it provides a safety for the HV signals and provide some mechanical stiffness in critical areas.

OBS: Discussion regarding potting the HV Board to the C-shaped aluminum HV board mounting bracket. This will provide a direct thermal connection to the bracket.

ACTION 08.02: 3D print potting dams/walls for the HV board design (PNNL can provide). PNNL and IU will need to resolve layout details of the HV board, potting dam, wire-ways, pogo pins and PEEK retaining plate (on the forward end of the HV board)

OBS: The Pogo-pin being considered for the HV and Front Board design is: Mill-Max P/N: 0926-1-15-20-75-14-11-0

ACTION ITEM	
08.01	Due Date:
Responsibility	
Organization	Individual
IU	Visser
PNNL	Thompson
-	-
-	-
Description	

ACTION ITEM	
08.02	Due Date:
Responsibility	
Organization	Individual
IU	Visser
PNNL	Fast
-	-
-	-
Description	

08.02	**HV Divider Board Final Design Details**	08: HV Supply

HV Divider String Ratio:

Current ratio is: 0.3:1:1:1:0.68

Design criteria was: 0.3:1:1:1:0.66

ACTION 08.02.01: Determine the final HV divider ratio and implement the HV divider ratios in the production HV board design. What is optimal for operating at lower gain. Also, if ALD PMTs and non-ALD PMTs are used we may require two separate HV boards in order to operate the two tube types at maximum gain. (Nagoya, Inami, Matsuoka)

OBS: There is an approximate 4 month lead time to procure specific value components for the HV board.

ACTION 08.03.02: HV Board Serial number (this is through i^2c)—a mini cable that runs to the SCROD board (or other board) We may also want to run i^2c via pogo pins or a connector from the HV board to one of the other boards in the board stack.

ACTION 08.03.03: Add a Temperature Monitor on the HV board stack (i^2c)

ACTION ITEM	
08.02.01	Due Date:
Responsibility	
Organization	Individual
Nagoya	Inami
Nagoya	Matsouka
-	-
-	-
Description	

DECISION CONCURRENCE 08.02	
Nagoya::Inami	Undecided
U Hawaii: Varner	Undecided
Nagoya:: Iijima	Undecided
PNNL:: Asner	Undecided

ACTION ITEM	
08.02.02	Due Date:
Responsibility	
Organization	Individual
IU	Visser
UH	Varner
-	-
-	-
Description	

ACTION ITEM	
08.02.03	Due Date:
Responsibility	
Organization	Individual
IU	Visser
UH	Varner
-	-
-	-
Description	

03.01	**PMT Pin Selection**	03: PMT

Front HV Board:

OBS: Use Mill-Max #32 socket to connect the PMT to the Front board.

OBS: Are all 4 MCP pins connected together or are they isolated from one another? (ANSWER: They are all connected)

01.02	**CAD Design Environment**	01: Design

ACTION 01.02.01: Determine the best interface format for sharing 3D CAD files. [PNNL vaults are using Solid Works 2013]

ACTION 01.02.02: Resolve the Wiki file size limit, need to increase to 50 M Bytes per file (although this should be used sparingly).

ACTION 01.02.03: Resolve who will be the official holders of the iTOP drawing archive for the production detector design.

ACTION ITEM	
01.02.01	Due Date:
Responsibility	
Organization	Individual
PNNL	Fast
UH	Andrew
-	-
-	-
Description	

ACTION ITEM	
01.02.02	Due Date:
Responsibility	
Organization	Individual
UH	Browder
-	-
-	-
-	-
Description	

ACTION ITEM	
01.02.03	Due Date: 15 Aug 2013
Responsibility	
Organization	Individual
iTOP Task Force	-
-	-
-	-
-	-
Description	

01.03	**Prism Mounting Components: PEEK elements on Prism ends**	01: Design

OBS: The PEEK mechanical components on each end of the PRISM will need to be fabricated for each prism used in the production detector to accommodate differences in prism length. This will allow the other QBB parts (e.g. side rails) to all be made the same.

ACTION ITEM	
ID	Due Date:
Responsibility	
Organization	Individual
-	-
-	-
-	-
-	-
Description	

15.01	**Calibration Light Source**	15: Calibration

OBS: Specific Calibration runs are not planned at this point. Instead, calibration data will be collected during experimental operation.

OBS: The critical performance dimension is the stability of the individual time-offset values for each channel, not the time-offset value itself. Therefore, the length of the calibration fibers are not critically important.

OBS: Which is most important: T0 or ∑T? We need to measure both—many opportunities to measure ∑T, will need periodic calibration with the master experiment T0.

OBS: Multi-mode fiber is not going to maintain sufficient timing calibration; single-mode fiber will be needed but single-mode fiber will require a much greater level of power on the light source (pico-second pulsed laser).

OBS: PMT Intensity/response Calibration; is a separate issue that is not tied to the calibration light source.

15.02	**Calibration Light Insertion**	15: Calibration

ACTION 15.02: A plan/approach and a design for providing calibration light for the iTOP modules is needed. The solution needs to address:

- T0 and delta-T measurements
- PMT illumination
- Fiber-to-Quartz Bar interface
  - High quality interface
  - Minimal/no TOF photon interference
- Fiber routing (interface to Experiment Services)
- Light Source

ACTION ITEM	
15.02	Due Date:
Responsibility	
Organization	Individual
INFN	Mussa
-	-
-	-
-	-
Description	

09.01	**Quartz Bar Metrology Orientation**	09: Det. Asst.

ACTION 09.01.01: Vendor needs to provide an unequivocal means to establish the reference of the orientation of the metrology measurements made by the vendor. [Note: bar vendors have been contacted to resolve this]

ACTION 09.01.02: A table of QA measurements needs to be established, distributed to the iTOP collaborators for the iTOP Assembled Optics.

ACTION ITEM	
09.01.01	Due Date:
Responsibility	
Organization	Individual
PNNL	Fast
-	-
-	-
-	-
Description	

ACTION ITEM	
09.01.02	Due Date:
Responsibility	
Organization	Individual
UC	Schwartz
-	-
-	-
Description	

03.02	**PMT Module Assembly Test Stand**	03: PMT

ACTION 03.02: A PMT Module Test Stand needs to be defined, designed and fabricated. This is the final test before the PMT module is attached to the prism. A test plan/approach should also be developed and shared with the iTOP collaborators.

ACTION ITEM	
03.02	Due Date:
Responsibility	
Organization	Individual
KEK	Inami
UH	Varner
Nagoya	-
-	-
Description	

03.03	**PMT Testing at Nominal Voltage + xx%**	03: PMT

OBS: PMTs should be tested to an operating voltage *~100 Volts* greater than the nominal operating voltage. Low gain PMTs should be tested to "normal" operating voltages.

ACTION 03.03: Decide if this is warranted and or recommended. Consider contacting Hamamatsu regarding advisability of testing SL-10 PMTs at Nominal Voltage+100V

ACTION ITEM	
03.03	Due Date:
Responsibility	
Organization	Individual
KEK	Inami
-	-
-	-
-	-
Description	

01.04	**ECL Flange Detail Needed**	01: Design

ACTION: A detailed drawing and 3D model of the ECL mounting flange is needed. The entire flange needs to be fully detailed to enable a final, detailed design of the iTOP detector model. Specific items include interference identification, cooling tubing and wire routing paths, etc… (Nagoya, Inami) This needs to specifically include the CDC phi adjustment mechanism.

ACTION ITEM	
ID	Due Date:
Responsibility	
Organization	Individual
KEK	Inami
-	-
-	-
-	-
Description	

01.05	**iTOP Cooling**	01: Design

ACTION: A collaborator needs to be identified to address the iTOP cooling system. (assisted by Asner and Browder)

ACTION ITEM	
01.05	Due Date:
Responsibility	
Organization	Individual
-	iTop Co-Conveners
-	-
-	-
-	-
Description	

17.01	**Services Allocation Definition**	17: Expt. Support

ACTION 17.01: The Belle II Services Allocation information needs to be made available to the iTOP collaboration. This information needs to be shared on a common site (iTOP Twiki) so that all have access to the latest information. This information needs to be updated as it changes.

ACTION ITEM	
17.01	Due Date:
Responsibility	
Organization	Individual
KEK	Inami
-	iTop Co-Conveners
-	-
-	-
Description	

01.06	**Holes in the CDC Support Cylinder**	01: Design

ACTION 01.06.01: The CDC detector group needs to be contacted and the concept of making holes in the CDC support cylinder discussed. (64 10mm holes) (Nagoya, Inami)

ACTION 01.06.02: If the CDC group concurs with the requested modification to the Support Cylinder, a design needs to be completed and reviewed relative to the holes needed by iTOP. This cannot occur until the final version of the board stack is complete.

ACTION ITEM	
01.06.01	Due Date:
Responsibility	
Organization	Individual
	iTOP Co-Conveners
-	-
-	-
-	-
Description	

ACTION ITEM	
01.06.02	Due Date:
Responsibility	
Organization	Individual
PNNL	Fast
UH	Andrew
-	-
-	-
Description	

01.07	**Final Design Tolerance Analysis**	01: Design

ACTION 01.07: An evaluation of tolerances must be completed that will insure that iTOP detector modules will perform as specified. This is a very detailed evaluation that will require input from the engineering design team and from the scientific measurement team in order to identify all of the critical parameters and to identify all of the mechanical variability in the iTOP detector design.

ACTION ITEM	
01.07	Due Date:
Responsibility	
Organization	Individual
PNNL	Fast
-	-
-	-
-	-
Description	

01.08	**iTOP Detector Mechanical Sag Specification**	01: Design

DECISION 01.08: A decision has been reached that a maximum sag (deviation from the straight condition established during the QBB assembly on the granite slab) of 0.2mm in the radial dimension is established for the iTOP detector when it is installed in the Belle II detector.

A maximum deviation of 0.5mm is tolerable during assembly and relocation of iTOP detector modules. This imposes a requirement on the strong-back design to insure this dimensional tolerance is not exceeded. 0.5mm deviation represents a safety factor of just 14.

DECISION CONCURRENCE	
Nagoya::Inami	Concur
U Hawaii: Varner	Concur
Nagoya:: Iijima	Concur
PNNL:: Asner	Concur

01.07	**Real-Time &Monitoring QBB Flatness Specification**	01: Design

ACTION 01.07: A method to constantly insure the total deflection of the QBB remains within specification needs to be included as part of the QBB Strong Back assembly. This system should provide an immediate (real time) alarm if:

- Linear deflection from straight (0mm) exceeds 0.5mm (one on each long side)

At any time during moving of the assembled quartz modules.

ACTION ITEM	
01.07	Due Date:
Responsibility	
Organization	Individual
KEK	Suzuki
Nagoya	Kichimi
Nagoya	Kohriki
-	-
Description	

22.01	**iTOP Detector Information Database**	22: Other

ACTION 22.01: A database system needs to be designed and implemented to track all of the critical data for the iTOP detector.

iTOP conveners need to develop the list of data that should be tracked. When this list is complete, a data management system needs to be developed and maintained and made available to the iTOP collaboration. Redundancy and data backup needs to be a major consideration in the design of this system.

(is there a similar system in use in the Belle II or other collaboration?)

ACTION ITEM	
22.01	Due Date:
Responsibility	
Organization	Individual
-	iTop Co-Conveners
-	-
-	-
-	-
Description	