Comments on Barrel PID part

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I. General:
- Introduction (X.1 and X.2) seems not sufficient.
- English need some improvements especially in the sections, X.1, X.2 and X.3.
  The PID power in X.2*, Measurement non idealities* in X.3.1
  We have recently the received the mirror in X.4.1.2.
  etc…….

II. Conceptual design
- It should be explained clearly what is the straegy to reduce the chromatic effect. Focusing? Longer wave length? The formula given here seems not useful for this purpose.

III. Options
- No critical description for having two options and comparison among them.

IV. Status of components

1. Quartz radiator
   - It is not clear how critical those specifications are.
   - Optimization of geometrical parameter should be presented logically.
   - Too much detail for optical attachment without any measurement results.
2. Photon detector
   - When the photon detector option to be decided? It should be done after QE stability confirmation.
   - What about QE aging (degradation) for SBA or GaAsP ?
   - Why a long tail in the TDC distribution in Fig X.7 appears? Does your simulation implement the effect? What the resolution of 31 psec means?
3. Electronics
   - The timing resolution demonstrated in Fig X.13 can be held even for the timing difference as large as 5usec L1 trigger latency? What is “readout granularity” shown in Table X.3.
   - Are there sufficient study for radiation effect in terms of SEU under SKEKB environment? Show the result to conclude that *the radiation tolerance of the components test thus far is adequate* in X.4.3.2.
4. Mechanical structure
   - You mention in X.4.4.3 as “ tracking resolution <1mrad is essential” , while you assume 1.5 m rad in 1.6.4.2. Why?

- Illustrations given in Fig. X.16 are not clear. What is xxx flange ?
- Please show some illustrations of a module container and its supporting structure for a quartz bar. Where and how many threaded plungers are equipped ? Is it safe against earth quake?
- *The mecahincal width and thickness of a single TOP module is dictated by a trade-off between ……*in X.4.4.2 should be verified.

V. Prototype test
- A high-pass filter is inserted in the real detector system?
- Show the performance for the case with the distance between the incident position and MCP is larger than 925 mm and exhibit how critial the optimal condition could be.
- Demonstrate how well the focusing mirror will work.
- It seems several channels are not working well in Fig X.22(a). What happens with them.
- Are the background hits explained in Fig X.22(c) included in Fig X.22(b)? Are they implemented in your performance simulation ?
- What is "the center of the readout" mentioned in the caption in Fig X.22(c)?
- It is not clear how well the beam test validates the simulation code to be used in the performance expectation including the calibration capability in a real detector system.

VI. Expected performance
- Is multiple scattering inside quartz bar is considered?
- For the background simulation, are any timing correlation considered for the 7 background photon ?
- Can you have a prototype beam test with one bar option?