

B-factory Programme Advisory Committee

Short Summary

8th meeting, 9 – 11 February 2014 at KEK

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Short Summary of the Review

During the 8th review meeting, the committee heard the status of the Belle physics analysis, physics programme of the Belle II experiment and the construction of the Belle II detector. This report is a short summary of the committee's findings and recommendations.

The committee is very pleased by the ongoing analysis work with the Belle data and strongly encourages the collaboration to exploit the Belle data for the coming years until the Belle II data become available. The Belle II collaboration has started to set-up a physics programme for the first period of physics data taking with a partial barrel particle identification system and limited amount of collected data. The committee thinks that this work is very important and should be continued.

For the construction of the Belle II detector, the committee heard presentations on Interaction Region, Pixel Detector (PXD), Silicon Strip Vertex Detector (SVD), Barrel Particle Identification system (TOP), End-cap Particle Identification system (ARICH), Electromagnetic Calorimeter (ECAL), K-long Muon Detector (KLM), Trigger and Data Acquisition, Software, and Computing Resources.

Steady progress in understanding of the machine background at the interaction region has been made and it is found that the new beam pipe design further decreases the synchrotron background. The committee is very interested in learning the results of further studies on the synchrotron background due to misalignment and beam halo.

While the schedule remains tight, the current plan for the PXD and SVD is compatible with the overall schedule of the Belle II experiment. The committee congratulates

the VXD group with their successful test beam run at DESY which provided very valuable running experience. Thermal management of the VXD is quite complex and the proposed program for a full thermal mockup of the VXD is strongly supported. The committee hopes to see the prompt start of the SVD ladder construction in the coming months.

The committee congratulates the Central Drift Chamber (CDC) group for the completion of the wire stringing. However, remeasurements show that the tension of many sense wires became lower and they need to be restrung. The wire tension must be continuously monitored for the coming month. Further irradiation tests of electronics are encouraged.

Recent progress achieved on the design of the TOP bar box is impressive, and the current design appears to address the essential requirements. However, further mechanical analyses and prototype mockups are needed to attain and confirm the final design. We believe that any necessary bar box design refinements could be accommodated with bars as presently specified, so that, given the long time needed to procure the quartz bars, the committee feels that the purchase of the quartz bars should proceed as soon as possible. For the ARICH, careful monitoring of the quality of the photon detectors being delivered must continue.

The committee noted, with pleasure, the success of the barrel KLM detector installation and progress being made for the commissioning. The delay in the production of the preamplifiers for the end-cap KLM is a concern, since this will have an effect on the ECAL electronics installation that follows the end-cap KLM installation. The committee recommends a swift action to mitigate this delay. The ECAL group is recommended to monitor carefully the progress on the KLM installation and to consider alternative installation plans if necessary.

The work on the Trigger and Data Acquisition is advancing well. The PXD group made good progress on the development of the slow control system, which could benefit other groups. The committee particularly acknowledges their work on the interlock system to protect the PXD detector and recommends a similar effort to be made for the whole Belle II detector. The committee supports the increased effort by the collaboration to better coordinate the software effort. Further understanding of the required computing resources is strongly encouraged.

Radiation hardness of the fronted electronics is a common problem for most of the subsystems. In addition to the work by the individual subsystem group, a common effort by all the subsystems concerned is encouraged.