**Belle II PXD EVO Meeting**

30.11.2010

Present:

Sergey Fourletov, Carlos Mariñas, Andreas Ritter, Oksana Brovchenko, IEKP Karlsruhe, Soeren Lange, Andreas Moll, Andreas Wassatsch, Christian Kiesling, Jelena Ninkovic, Shuji Tanaka, Bartlomiej Kisielewski, Marcel André Vos,

Laci Andricek, Ichi Kishishita, Norbert Wermes, Yutaka Ushiroda, Zdenek Dolezal, Martin Ritter, Henryk Palka, David Moya, Manuel Koch, Philip Pütsch, Julia Furletova, Frank Simon, Mikhail Lemarenko, Rainer Richter, Raimon Casanova, Hans Krueger, Christian Koffmane,

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| 10:00 | B2GM report (20') ([files Slides](http://indico.mppmu.mpg.de/indico/materialDisplay.py?contribId=0&materialId=slides&confId=1027) pdf file  )  |  Christian Kiesling |

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| 10:20 | CO2 cooling tests in Karlsruhe (20') ([files Slides](http://indico.mppmu.mpg.de/indico/materialDisplay.py?contribId=1&materialId=slides&confId=1027) pdf file  )  | Stefan Heindl |

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| 10:40 | Materials for rapid prototyping (20') ([files Slides](http://indico.mppmu.mpg.de/indico/materialDisplay.py?contribId=2&materialId=slides&confId=1027) pdf file  )  | Carlos Marinas |

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| 11:00 | Mechanical Amplifier (Alignment) (10') ([files Slides](http://indico.mppmu.mpg.de/indico/materialDisplay.py?contribId=5&materialId=slides&confId=1027) ppt file  )  | David Moya |

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| 11:10 | Test beam report (20') ([files Slides](http://indico.mppmu.mpg.de/indico/materialDisplay.py?contribId=3&materialId=slides&confId=1027) pdf file;   [files more information](http://indico.mppmu.mpg.de/indico/materialDisplay.py?contribId=3&materialId=0&confId=1027)  )  | Marcel Vos |

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| 11:30 | AOB (20')  |

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(http://indico.mppmu.mpg.de/indico/conferenceDisplay.py?confId=1027)

1. **B2GM report (C. Kiesling)**

General Belle II issues:

The approval procedure seems to be fixed now. The project has been reviewed by MEXT and a positive decision was taken in October. A further review, with the prime minister took place in October giving the project highest priority. Approval by Ministry of Finance is expected in December and final approval by Diet in March 2011.

KEK plans a groundbreaking ceremony April 8, 2011. Here we want to have a strong participation and preparations have started.

Two US institutions became member of Belle II (Pacific Northwest National Lab (David Asner) and Luther College (Todd Pedlar)). There are indications that more (large) US labs are interested.

Issues concerning PXD:

SVD will be slanted (has some consequences for our service routing, e,g. The location of the patch panels could be fixed).

Location of DHH and Power supplies for the PXD has been identified (top of Belle II) and the service path determined. The distance will be less than 12m.

Work on slow control and databases started.

Commissioning of superKEKB will not start before October 2014. The cosmic ray tests of Belle II will happen in parallel. First beam will be without inner detector.

For us it means that we have to deliver the PXD in May 2014, one year later than originally scheduled (not unwelcome) .

A new beam pipe design was shown, with the radius increased by 0.7mm in the EOS region. We have to see how we can accommodate this. The clearance is now only 1.3 mm. This may be sufficient, but careful checks are needed.

It turns out that a major problem is due to the fixation screw. A new solution with a flatter screw requires a larger hole diameter, 4.5 mm(!) instead of 1.5mm. Consequently space on the EOS becomes critical.

The high value for the QED background by superB can now be excluded with 99.6% C.L.

A new idea to select efficiently hits form low momentum tracks was discussed, based on their high energy deposition in the PXD.

Injection noise: the injection rate will not change (50 Hz) but there is hope that the damping time can be reduced.

1. **CO2 cooling tests in Karlsruhe (S. Heindl)**

Stefan explained the (open) CO2 cooling setup in Karlsruhe. A support/cooling block (from Munich) was cooled to -30 deg, without heat load. Dummy silicon modules with resistive heaters and PT1000 sensors are being prepared. When mounting them in turned out that the mounting surfaces of the cooling blocks are not flat, but curved. They had to be polished by hand to obtain a flat, smooth surface. Results from tests with heat loads are expected in January.

A closed CO2 cooling system is available at CERN and can be used by Karslruhe. This system allows long term tests, scheduled in February.

A meeting on cooling will be organized in February (before the DEPFET meeting in Bonn)

1. **Materials for rapid prototyping (C. Marinas)**

Firstly Carlos gave an update on the cooling mock-up under construction in Valencia (getting ready).

He showed a list of materials which are available for rapid prototyping by the manufacturer in Spain. Interesting are DM20, a bronze alloy with a heat conductivity of 30 W/mK, and an Aluminum alloy with even 140 W/mK. Steel has 15-20 W/mK. Of course other parameters are important as well: the block must be antimagnetic, stand high pressure and allow machining.

It was agreed that blocks made in these materials will be ordered. In addition the blocks not needed immediately in the mock-up will be sent to Munich for pressure tests.

1. **Mechanical Amplifier (D. Moya)**

David reported on the production of the omega- or S-shaped strain conversors needed for the alignment monitor. The tooling for casting them has been prepared and they can be made till January, calibration will be done in February. A mechanical interface for mounting these sensors between SVD and PXD is being designed. It was suggested to keep Imanuel Gfall from SVD informed. Imanuel also wants to get samples of the strain conversors (mechanical only, no calibration needed).

News on the irradiation tests will be given next EVO meeting.

1. **Testbeam Report**

Marcel reported on the recent test beam at CERN (Nov 15-21). This time a new hybrid with DCD-B, switcher B (but still PXD5 matrix) was tested. The system was very new and essentially untested, and it was clear that one could not expect the same results as of last year’s test beam (with ‘plug and play’ modules). Even bench power supplies were needed again (so there is need to make new dedicated PS for lab and test beam). Nevertheless the system (just one) worked.

Observations::

* Switcher B seems to be fragile, two died. The reason is unknown. To be checked in the lab.
* Pedestal spread is large and covers 2/3 of the dynamic range of the DCD. The offset current could only be compensated up to 90µA, which was not sufficient and meant that the DEPFET had to be operated at a lower gate voltage than intended (resulting in a lower gq). This is a puzzle, because at the nominal voltage the drain current should only be 50 µA.

The max current compensation of 90µA is a bit on the low side, since the operating range foreseen is 50-100 µA. The higher value results in a higher gq, and power estimates in the TDR are made for 100µA.

* Some pedestal variations were observed.
* Some ADC occasionally show bit flips.
* The noise changed from 0.8 LSB to 1.3 LSB after changing some matrix settings.
* The signal seems to be too low (related to the operation at lower gate voltage?)

This is very important information and that there is a lot to be investigated in the lab now. Still, Marcel hopes that the analysis of the data will yield some ‘conference quality’ results.

Next test beam: We should ask for a period in June 2011. This will be too early for the new DCD-B, but will be the last opportunity to test PXD6 matrices before parameters will be fixed for the final production.

1. **AOB**
* Marcel proposed to look into a more powerful cluster algorithm able to separate overlapping clusters in order to improve the two track resolution. ATLAS is looking into this and we could profit from this work. Christian mentioned that in ATLAS the problem is to separate nearby tracks, which will rarely be the case in Belle II. Here the problem is overlaps of real tracks with background hits of (yet) unknown shape. Hence it is important to understand the background first. Nevertheless it is worthwhile to keep an eye on such developments which could improve performance.
* Next meeting: December 14, 2010, 10:00