



# Report to the IB



- Cost & Funding
- Milestones reached at this Meeting
- Progress reported at this Meeting
- Concerns expressed at this Meeting
- Outsourcing of sub-workpackages
- Decisions, Recommendations to be made

# Details of Costplan PXD



BGr.	Item	Cost (k€)	Description
1	PXD6 prototype-production	300	DEPFET-sensor production
	Prozessing	50	masks (+dummies), implantations
	Thin Oxides	120	tests
	PXD7 sensor-production	870	DEPFET-sensor production
	processing	60	masks, implantations
	SOI-material	100	wafers & bonding
2	Switchers (MPW)	30	Switcher development
	DCD2 (MPW)	30	digitizer chip development
	ASIC-production	80	switchers & DCD2 ASIC
3	Data Handling ASIC (DHP)	400	90 nm technology, MPW & production
	readout FPGA	150	data-encoding
	Data Handling Hybrid	50	CC or AIN hybrid
4	R&D interconnection techn.	100	ASIC thinning, flip-chip-bonding
	Interconn.-tech., series prod.	100	Thinning and bonding
5	Mechanics / Cooling	40	prototyping
	mechanical support	150	sensor support structure
	cooling	110	cooling system (liqu. + air)
6	DAQ and test systems	380	test boards, control, DAQ
	Cables, data transmission	100	optical links etc.
	Power supplies	50	100 V max.
	Slow Control	50	survey/control systems
	<b>Summe</b>	<b>3320</b>	

- BMBF Funding period 2009-2011:

DEPFET activity in Belle-II is partially funded (~ 60%) , meets the general support of the ministry, approval of SuperKEKB has helped

- Blocked money has been released, Gießen and Bonn2 could be funded
- LMU, TUM: very positive evaluation by the GA, but only travel money granted so far in the current funding period (until 2011.06)
- MPI is funded, coming years are already secured
- Common Fund of DEPFET Collaboration exists, filled by Prague and MPI :

based on our MoU, the fund is filled on a voluntary basis!

Contributions so far (2009 / 2010):

Prague	138 400	€
MPI	30 000	€

Total	168 400	€
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Spent so far:	13 090	€
	693	€
	643	€

Total	14 426	€
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Obligo	26 816	€
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TC1 production  
Support of PXD-DAQ  
workshop in Grünberg

DHP-Cluster algorithm



# Milestones reached at this Meeting



- CO2 Cooling works
- First thin DEPFETs have been produced
- DEPFET first time in a (strong) magnetic field
- Simulation software close to ready in the new framework
- LVDS signal with pre-emphasis over long lines

- electrical mockup of ladder on a good way
- DCD „high speed“ test chip (TC1) due very soon
- PXD/SVD mockup being realized
- DAQ (ATCA CN) ready for the April test
- FOS (dummies) available early summer
- Passive Patch Panel: good chance to be OK

...

- **Sensors:**

Our SOI concept leads to reduced breakdown voltages of back diodes -> improvement necessary

Results on radtests: unexpected increase of threshold voltage at gate voltage of 5 V

SOI material for main production not yet secured

- **Electronics:**

ASICs might be (too) late, Switcher yield, DHP process @IBM ?

- **Cooling:**

need engineering power for development of closed (CERN) system

# B2GM at KEK

## Commissioning procedure

Yutaka Ushiroda

No earlier than 2014.10

Roll-in position

Linac commissioning,  
MR commissioning phase 1

Main Ring commissioning with BEAST II, without Solenoid, probably with Aluminum beam pipe.

BEAST II

phase 2

Main Ring commissioning with Solenoid. VXD is not installed in Belle II.  
Field measurement along beam line.

VXD = BP+PXD+SVD (scenario 1)

Belle II w/o VXD

GCR

Physics Run

<1 month  
Global Cosmic Ray w/o B field if required.

Belle II

Belle II roll-in

VXD installation

Belle II constructed

Belle II

Global Cosmic Ray w/ and w/o B-field

Extensive Software-completion Phase (slow-control, online, alignment, PXD-ROI, ...)

VXD

Roll-out position

We gained at least 6 months, maybe more ..



Meeting on Nov. 15, 2010

## 3.2 Comments and Recommendations

The progress on the pixel detector to date is laudable. There have been some setbacks in the production yield of full matrices, but the source of the problem has been understood. At the last review it was recommended that an effort should be given to gain some contingency in the schedule. With the new installation schedule, a contingency of about six months has been gained. The current production schedule of the sensors requires the start of the production before all tests on the full-size sensor and test structures have been completed. Given the gain in contingency, the committee suggests that the collaboration consider the possibility to delay the start of the production of the final sensors until all the tests have been completed. It seems prudent, since there is no significant risk to the new schedule, to **exercise a full readout chain with the final version of all ASICs before production for the final sensors is released.**

**We should take this recommendation seriously and push for a test with all ASICs before we start the final sensor production**

As recent history has shown, it is often mundane but crucial tasks, such as the power supply system and slow controls, that form the weakest link in the operation of the detector. It is a little worrisome that no solid commitments are in place to date for these areas. The collaboration is urged to secure solid efforts on these critical aspects of the PXD detector.

We need to develop a custom-made P/S system

Our lead institute (LMU) clearly needs support from the collaboration. Krakow offered help and is really needed to contribute on the engineering level.

And we must get external help for the slow control functionality.  
Proposal for firmware: Prof. Knoll et al., informatics, TUM.

Cost: 50 kEur + 19 %VAT

The detector is of such complexity that careful attention needs to be paid to the electrical isolation of the pixel detector and its grounding scheme, the mechanical system engineering aspects and the interplay between the PXD, SVD and CDC. The current level of effort in these areas is uncomfortably low. We again strongly recommend that the system engineering aspects be strengthened.

Here, we should consider to get external help from grounding experts with proven track record. There is such a proposal, (Fernando Arteché et al., Instituto Tecnológico de Aragón)

Detailed work plan exists

Cost: 45 kEur in 2011 (w/o tax and travel)  
45 kEur in 2012 (w/o tax and travel)

- Close-to-final ASICs for full test of the sensor prototypes:  
full-speed test of large sensors BEFORE  
starting the final sensor production

- Outsourcing of Sub-Work Packages

P/S slow control: 50 kEur + 19 %

Grounding of PXD: 45 kEur + 19% (in 2011)

Proposal: take from the common fund

- Power supplies: „off-the-shelf“ solution not feasible,  
development to be done within the DEPFET Collaboration
- Engineering power needed in the CO<sub>2</sub> cooling sector: who