

## POF V MT Proposal -- Timeline

| WEEK      | MT                                                          | DTS                                                                    |
|-----------|-------------------------------------------------------------|------------------------------------------------------------------------|
| Nov 10-14 |                                                             | To Do's (next pages)<br>Comments on content by Peter, David, Sebastian |
| Nov 17-21 | Topics complete chapters<br>including links, FEOPT, etc     | Language (Steve, David)<br>Implement "internal" comments               |
| Nov 24-28 | Language improvements,<br>uniformity in text                |                                                                        |
| Dec 1-5   | Feedback from MT and maybe<br>external readers (proposals?) |                                                                        |
| Mid Dec   | Handing in of proposal                                      |                                                                        |

# POF V DTS: actions until Friday November 14

**General:** we do not worry about shortening the overall length for the moment, first fix the text and see if we will be asked to shorten.

## Tasks as discussed and distributed during the EB meeting on November 6@GSI):

- It was agreed that the "system part" of X-ray optics will stay in ST3:
  - **Clemens**: fix the language in ST3 and elsewhere to clarify what is really meant rather than simply "X-ray optics" (which indeed indicates more the system than the material, sensor, engineering parts) (Silvia writes email)
  - **Moritz and Piotr (?)** check in ST3 / ST4 that the description reflects this distribution (system and engineering in ST3, method in ST4)
- **LINKS:**
- **Michele**: links to ARD (see later slides with list of items) (contact Erik)
- Links to MU:
  - \* **Moritz** with FPF
  - \* **Piotr** with CML
  - \* **Andreas** with MRU (KATRIN, dark matter)
- Links to MML: **Heinz**
- Links to DMA: **David**  
Some notes are on a later slide

# POF V DTS: actions until Friday November 14

- **FIGURES**

- Figure with DTS structure: **Andreas**

- Pictures:

- Maybe 3 with infrastructure (in a row, page wide, in 3.3.2)
- More individual pictures in 3.3.4 (Implementation) along the ST descriptions

ACTION: **Trixi, Christian, Andreas** select 3-4 pictures per center, upload them in overleaf (there is a dedicated subdirectory) and comment them for Heinz, Frank and Silvia, who will then select some for the final proposal

- **References** (**Simon**): reduce by a factor of 2, remove duplications, check some references added in overleaf and not linked yet
- **Moritz, Piotr, Andreas**: shorten ST3 to balance its length wrt other sub-topics
- **Andreas**: reduce the current text regarding DTS contributions to FEOPT to one good paragraph only (just listing the items)
- **Steve, Frank**: in ST2 make sure that half or one sentence mention possible contributions to detectors for gravitational waves (quantum sensors, cryogenic mirror cooling, etc)

## POF V DTS: actions until Friday November 14

- Peter, Sebastian, David (the “fresh” ones):  
please read whole DTS chapter and provide comments on the coherence, clarity, impactfulness of text  
Also: are the questions in the green boxes addressed properly? If not, what is missing?
- Heinz, Frank, Silvia take care of comments in overleaf
- Heinz, Frank, Silvia implement comments received from Marc

## POF V DTS: more actions

- Make sure that FoPoZi emerge from text
- Produce full list of milestones with dates (and centers)  
3 to 5 per sub-topic
- Mention future improvements to the annual meetings, like the organization of topical sessions to foster even more collaborations between topics, programs, centers, etc.

Collect unresolved items at:

[https://docs.google.com/document/d/1EicF70tmWaPRxloiQtEXK7dkW\\_IPXIfaMoyEtrDVqWQ/edit?usp=sharing](https://docs.google.com/document/d/1EicF70tmWaPRxloiQtEXK7dkW_IPXIfaMoyEtrDVqWQ/edit?usp=sharing)

## LINKS DTS ↔ ARD (1 of 2)

### What DTS does and is used in ARD:

- Beam diagnostics, including:
  - KALYPSO system: to measure the longitudinal and transversal profiles of beam bunches. The system is being standardized (Erik, ARD ST3)
  - Cryogenic Current Comparators (CCC, based on SQUIDs), in operation at CERN, planned for FAIR beam diagnostics
  - 180nm CMOS pixel sensors (ALPIDE) used to determine the beam composition in dual beams at GSI (hadron therapy)
  - Diamond sensors
  - Super-FRS at GSI: gas detectors
- Front-end electronics, readout: further developments are planned in the POF V period in DTS. Common DAQ approaches (e.g. microCTA, and others) (ARD ST3)
- Is silicon photonics going to be of interest in ARD, for what specifically?

### What ARD does and is used by DTS:

- Test beams from ARD facilities: electrons / photons at DESY, hadron/ion beams at GSI, to test devices, prototypes, small systems, etc. **Crucially important, should never be discontinued!**

## LINKS DTS ↔ ARD (2 of 2)

### **What DTS wishes from ARD:**

Possibly more access and closer collaboration with teams developing very fast, high frequency electronics (such as team of Holger Schlarb, DESY, ARD ST2 and ST3)

### **What does ARD wish from DTS?**

For example some instrumentation development for laser plasma accelerators in sense of diagnostics?

## LINKS DTS ↔ DMA

Collection of single items mentioned in the meeting on Nov 6

- DTS (its sensors and systems) produce the DATA which DMA uses
- (GSI) DMA develops a software framework for automatic differentiation, which we in DTS (ST4) use for calibrations, alignment, optimization of detector design, etc
- (GSI) DMA offers methods based on digital twins to implement systems for monitoring of detectors and systems, foresee failures, develop reactions to problems, etc.
- (DESY) New DAQ for test beams in development, called Constellation: DMA might be involved in providing the data management
- (KIT) DAQ link to used of GPUs and FPGAs as in online trigger farm, use of eterogeneous architectures
- (GSI) real time feature extraction: sensors produce data also at high rate (50 Gb/s) which are post-processed by DMA. From this, more precise information regarding the sensors themselves can be extracted
- (HIJ, GSI) calibration of quantum sensors requiring AI assistance
- (KIT) data management for KATRIN (slow control, quasi real time processing, on cloud)
- (KIT former MML) automation of beam line. Autonomous experiments

## OTHER NOTES

## DTS team

ST1 - Michele Caselle, Michael Deveau, Simon Spannagel

ST2 - Sebastian Kempf, Peter Micke, Steven Worm

ST3 - Piotr Gasik, Moritz Guthoff, Andreas Kopmann

ST4 - Clemens Heske, David Pennicard (the GSI person will be appointed a little later)

Center contacts:

Cornelia (Trixi) Wunderer - DESY

Christian Schmidt - GSI

Andreas Kopmann - KIT