**PoF III**

**Sensors, ASICs and Interconnects**

Sensors

Readout Electronics

Interconnects, Packaging and Innovative Materials

**Data Transmission and Processing**

Tbit/s Optical Data Transmission

Intelligent Programmable Electronics

Parallel Processing

**Detector Systems**

HGF-Cube

Compact Gaseous Systems

Fast photon and X-ray Detectors

Fast Timing Detector Systems

CMOS Sensor Systems (Percival)

**PoF IV**

For PoF IV, the basic structure of DTS with two generic subtopic and 1 application-driven systems subtopic will be retained.

The sensor portfolio will be extended to include superconducting sensors. This also requires R&D in advanced multiplexing techniques to readout these and other fast, energy sensitive sensor types.

In line with the position paper of Matter, we will prepare for new opportunities in neutrino and dark matter experiments. The successful collaboration between ARD and DTS in beam diagnostics shall be strengthened. We anticipate a close collaboration with DMA.

It is probably not necessary to identify all of the demonstrator systems at this stage, but several are already known.

Traditionally DTS is defining sub-subtopics or work packages within the subtopics. This reflects the breadth of the topic and helps to define clear responsibilities.

**PoF IV**

**ST1 Sensors and ASICs** (H. Graafsma)

Semiconductors (high-Z, radiation-hardness of Si, avalanche diodes, diamond) DESY, GSI, KIT

Cryogenic sensors (bolometric and thin-film high-temperature superconductors) KIT

Integrated electrical and optical circuits (and monolithic sensors) DESY, GSI, KIT

Interconnects, Packaging and Innovative Materials DESY, GSI, KIT

**ST2 From sensors to systems** (A. Kopmann)

Tbit/s Optical Data Transmission KIT

Advanced multiplexing techniques (for fast, energy-resolving detectors, examples are GHz MMC readout, multi-channel THz cameras, Tristan readout) KIT

Massively parallel heterogeneous digital systems DESY, GSI, KIT

**ST3 Demonstrator systems** (C. Schmidt)

The systems included should evolve with time and be updated at least twice during PoF IV. We will establish several systems with joint contributions by several centers.

Photon Science (optical data transmission, XFEL-upgrades) DESY, KIT?

Astroparticle physics (Neutrino masses, Dark Matter) DESY, KIT

Beam diagnostics (Kalypso, diamond detectors) DESY?, GSI?, KIT

Particle physics, hadrons and nuclei (Track triggering, pixel sensors for vertexing and calorimetry, gaseous detectors) DESY, GSI, KIT

Medical applications (USCT…) KIT

**Joint projects high-profile projects between MT/MU and MT/MML**

to be defined

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| --- | --- |
| *POF 4* | *POF3 (for comparison)* |
| **ST1 Sensors and ASICs** (H. Graafsma) | **Sensors, ASICs and Interconnects** |
| Semiconductors (high-Z, radiation-hardness of Si, avalanche diodes, diamond) DESY, GSI, KIT | Sensors |
| Cryogenic sensors (bolometric and thin-film high-temperature superconductors) KIT | - |
| Integrated electrical and optical circuits (and monolithic sensors) DESY, GSI, KIT | Readout Electronics |
| Interconnects, Packaging and Innovative Materials  DESY, GSI, KIT | Interconnects, Packaging and Innovative Materials |
| **ST2 From sensors to systems** (A. Kopmann) | **Data Transmission and Processing** |
| Tbit/s Optical Data Transmission KIT | Tbit/s Optical Data Transmission |
| Advanced multiplexing techniques (for fast, energy-resolving detectors, examples are GHz MMC readout, multi-channel THz cameras, Tristan readout) KIT | - |
| Massively parallel heterogeneous digital systems  DESY, GSI, KIT | Intelligent Programmable Electronics |
| Parallel Processing |
| **ST3 Demonstrator systems** (C. Schmidt) | **Detector Systems** |
| Photon Science (optical data transmission, XFEL-upgrades)  DESY, KIT? | HGF-Cube |
| Astroparticle physics (Neutrino masses, Dark Matter)  DESY, KIT | Compact Gaseous Systems |
| Beam diagnostics (Kalypso, Diamond?) DESY?, GSI?, KIT | Fast photon and X-ray Detectors |
| Particle physics, hadrons and nuclei (Track triggering, pixel sensors for vertexing and calorimetry, gaseous detectors)  DESY, GSI, KIT | Fast Timing Detector Systems |
| Medical applications (USCT…) KIT | CMOS Sensor Systems (Percival) |