Summary of the 9th MicroTCA Workshop @ DESY

1st – 3rd of December 2020

Holger Schlarb, Group leader MSK/DESY

DESY, 24.08.2021

HELMHOLTZ RESEARCH FOR GRAND CHALLENGES

DESY.

MicroTCA Workshop goals & motivation …

Provide an international forum for the regular exchange of information on MicroTCA systems to foster

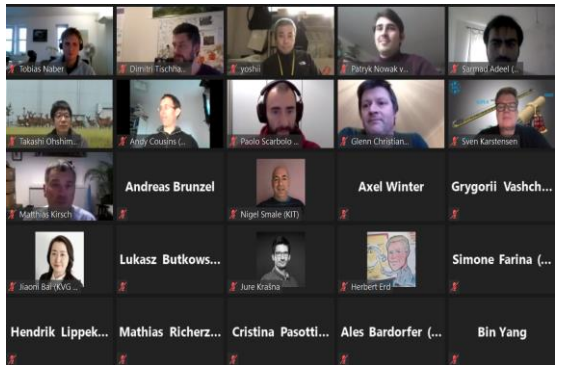
- **Communication** between researchers from different institutes and areas
- Close exchange of **industry and researchers** on products and services
- **Reuse of existing hardware** in projects to reduce market prices & improve matureness
- Identify and trigger **missing hardware development** (expanding product portfolio)
- Identify and overcome **interoperability** issues (may caused by the various interfaces)
- **Exchange of know-how** to achieve high performance & high availability while providing complex and highly specialized functionalities
- **Forward development** on the MicroTCA standard

Buildup and expand a sustainable MicroTCA ecosystem of Users & Producers

9th MicroTCA Workshop for Industry & Research

Statistics

	2020	2019	2018	2017	2016	2015	2014	2013	2012
Participants	197	199	190	183	159	177	188	191	180
Institutes	41	30	22	25	25	31	30	30	25
Companies	22	29	31	25	28	36	39	39	29
Exhibitors	9	12	14	13	14	14	16	16	12
Talks	44	43	43	38	38	45	44	53	42



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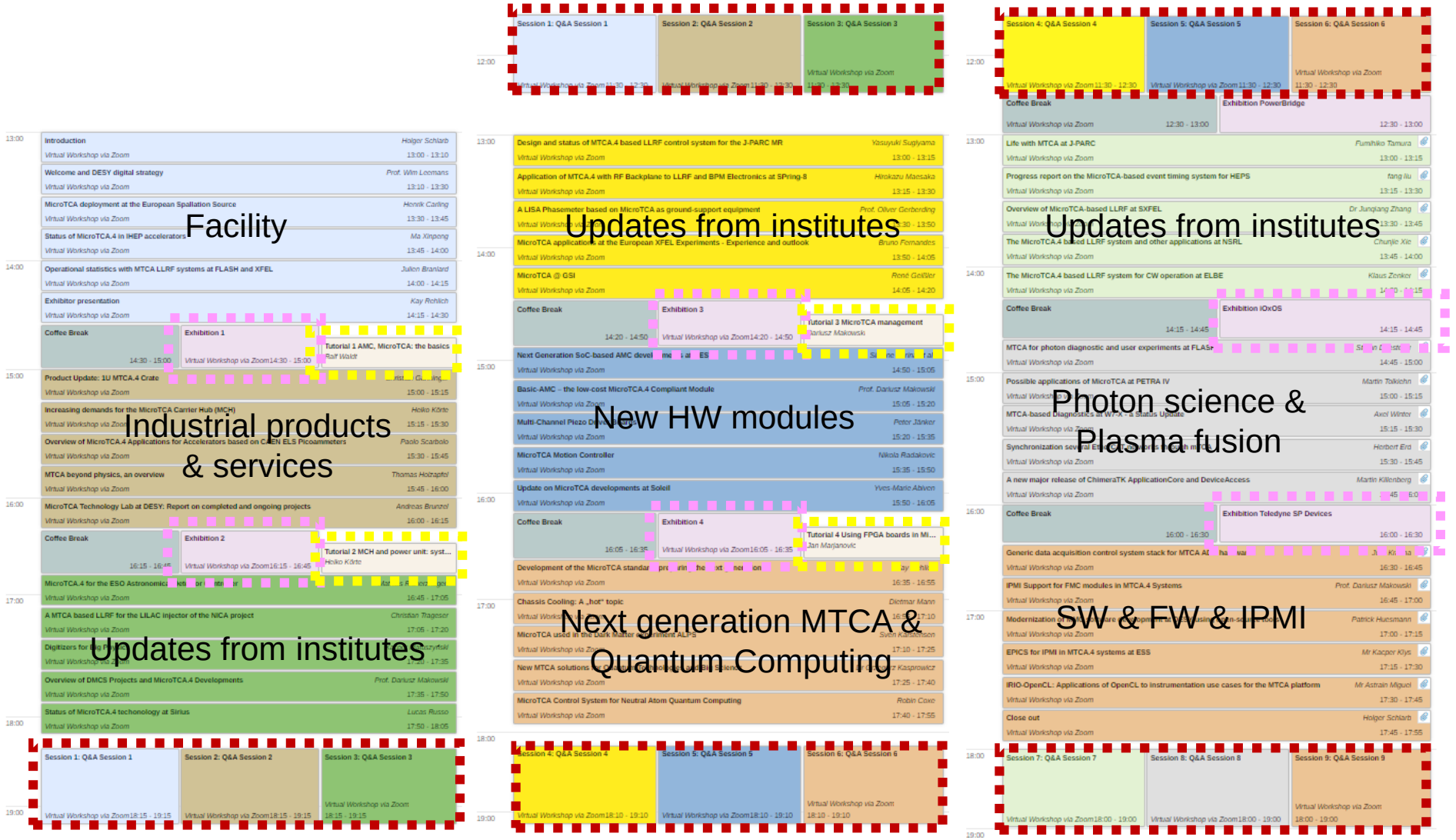
➔ https://mtcaws.desy.de/

Workshop program Tu / We/ Th

9 topical session (not strictly…) with in total 44 talks



Room for moderated discussion sessions

Exhibition:

Basic Tutorials

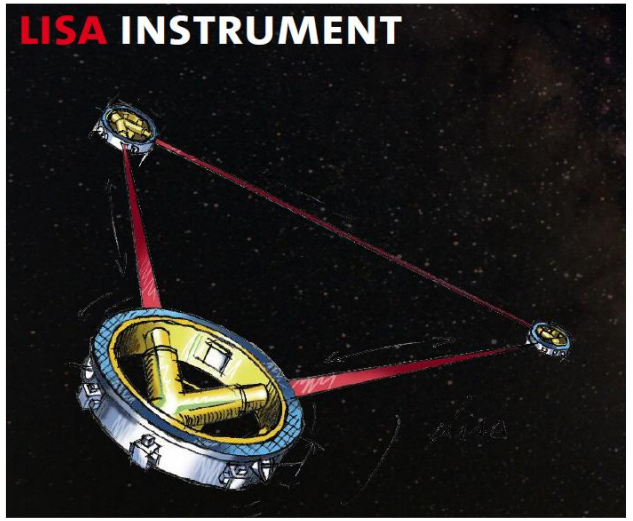
New communities joint …

This time contributions from:

Astrophysics Observatories

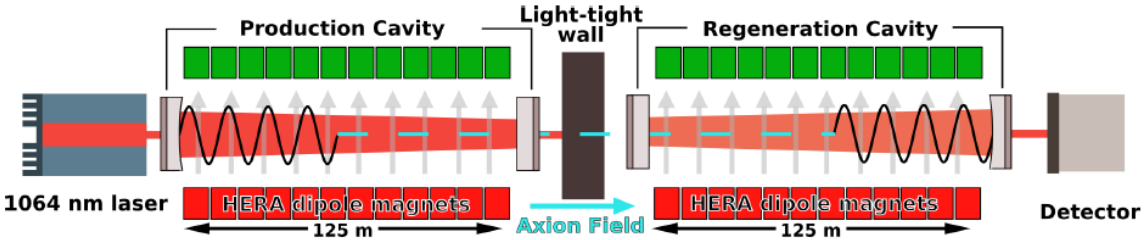
@Leander Mehrgan (ESO)

Gravitational Wave Detection



@Oliver Gerberding (UniHH)

Particle Physics: Axion research



@Richard Smith (DESY)

Quantum Computing

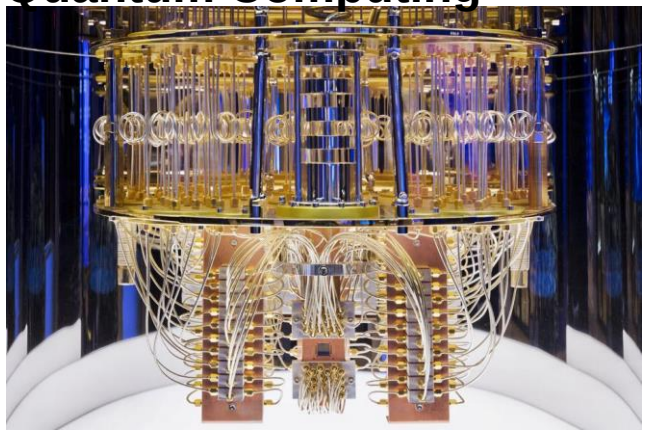
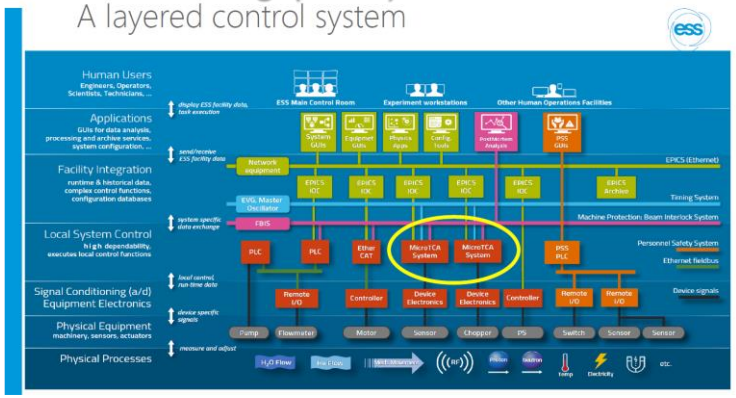


Image https://www.forbes.com/

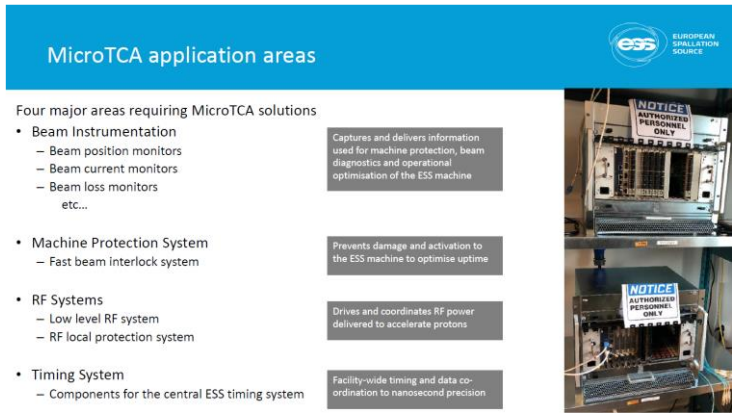
Quick overview on talks in session 1

… incomplete, teaser for looking up presentations

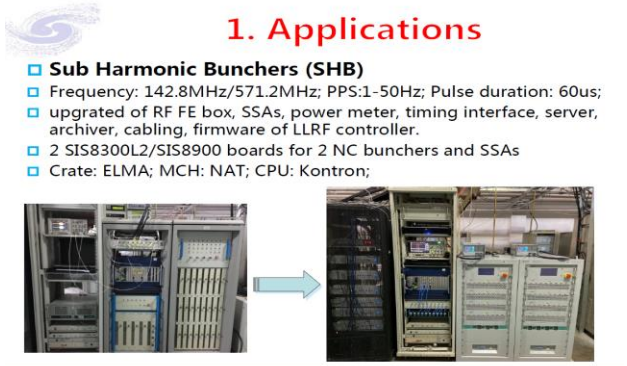
Henrik Carling (ESS)



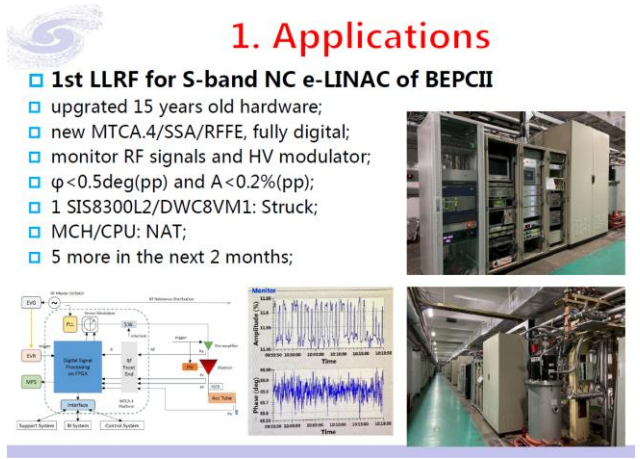
- Integrated Control System (MTCA/EtherCAT/PLC)
- MTCA: Beam Instr. /MPS/LLRF/Timing
- Standardization of HW/SW essential, 1.6 Mio PVs



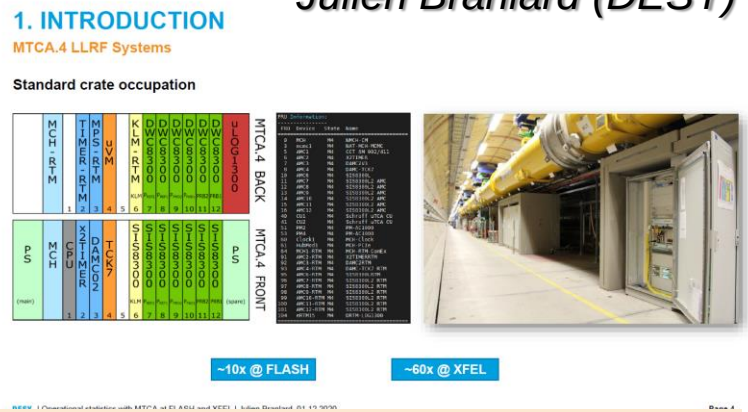
Ma Xinpeng (IHEP)



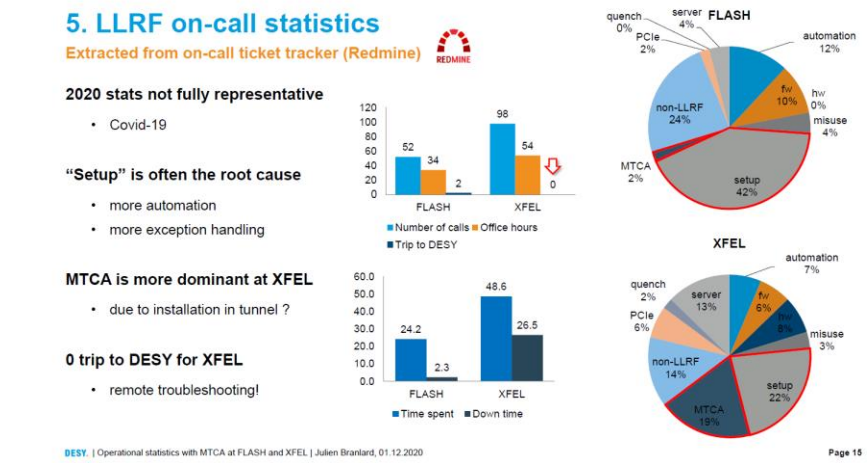
- Focus on LLRF systems
- IHEP HW development
- Integration & HW / MMC evaluation



Julien Branlard (DESY)



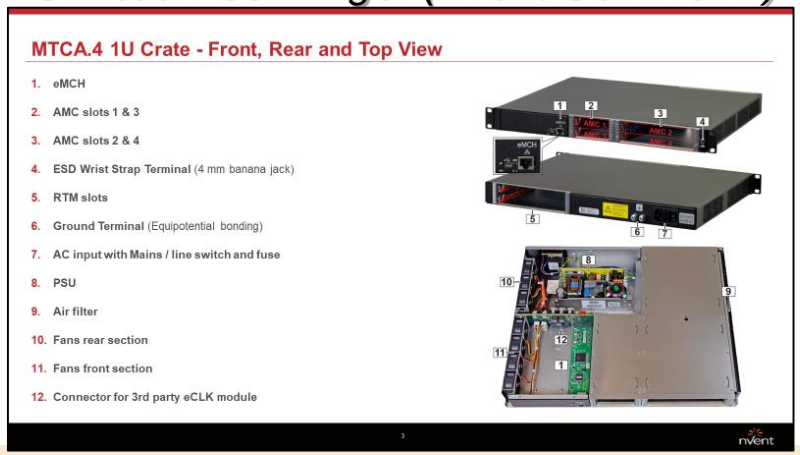
- LLRF System @ XFEL & FLASH
- Failure analysis & down times
- Radiation induced / PCIe / Exception handling



Quick overview on talks in session 2

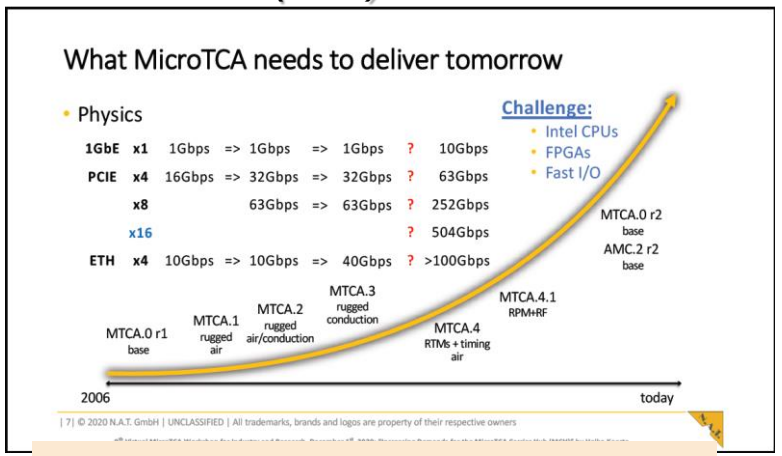
… incomplete, teaser for looking up presentations

Christian Ganninger (nVent SCHROFF)



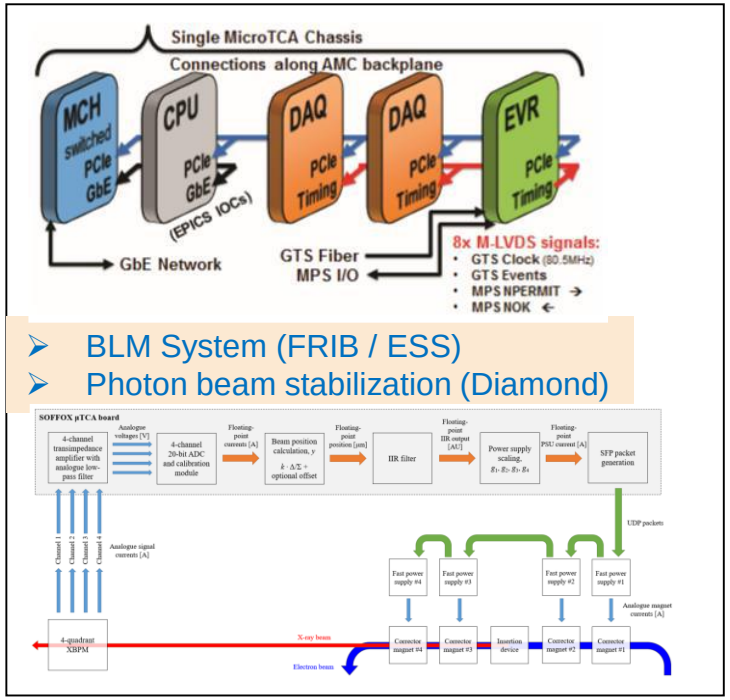
➢ Versatile small system chassis applicable for physics

Heiko Koerte (NAT)



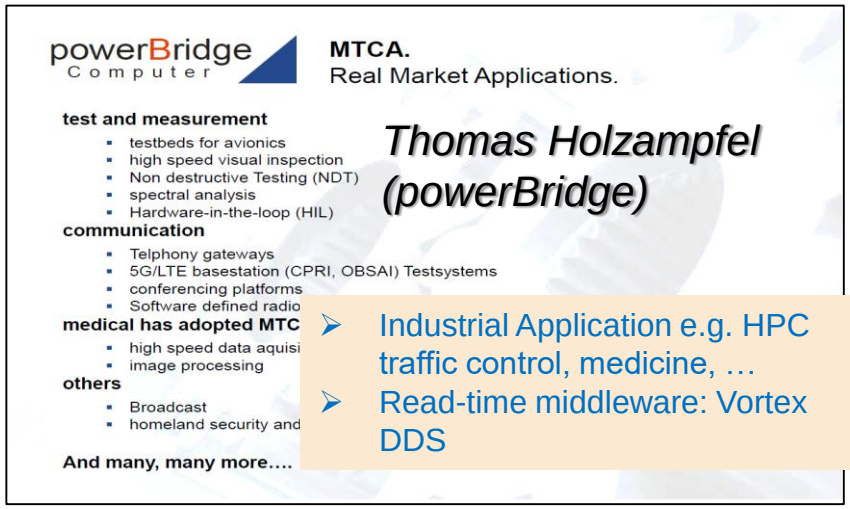
➢ Increasing transmission speed demands

Paolo Scarbolo (CAENels)



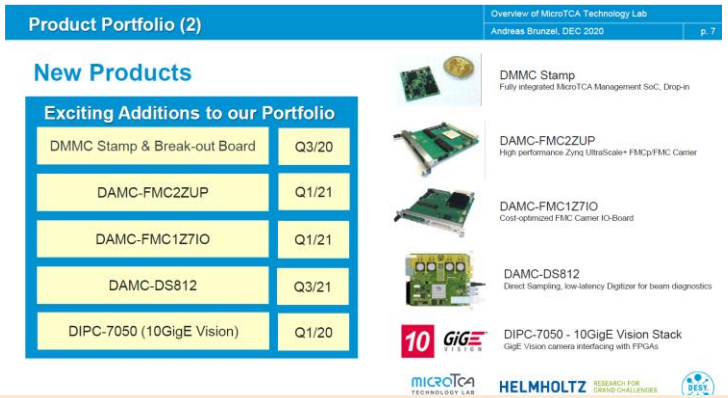
➢ BLM System (FRIB / ESS)
➢ Photon beam stabilization (Diamond)

Thomas Holzampfel (powerBridge)



➢ Industrial Application e.g. HPC traffic control, medicine, …
➢ Read-time middleware: Vortex DDS

Andreas Brunzel (MicroTCA Techlab)




The trainings are now held virtually via

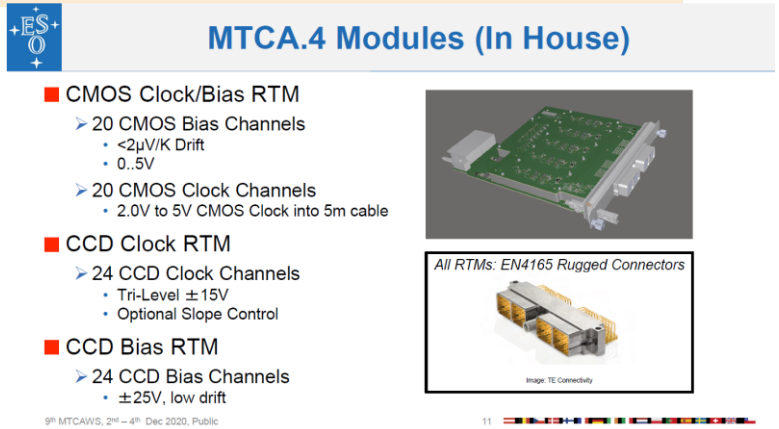
➢ Hardware devel./ Measurement Services / Trainings / MMC Software / LISA

Quick overview on talks in session 3

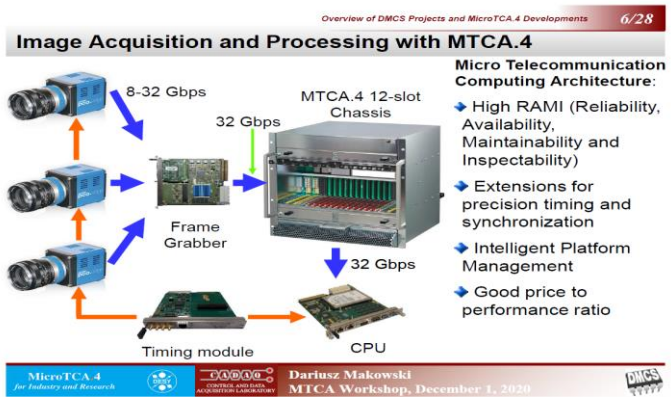
… incomplete, teaser for looking up presentations (+ SPdevice & Bevatech)

Matthias Richerzhagen (ESO)

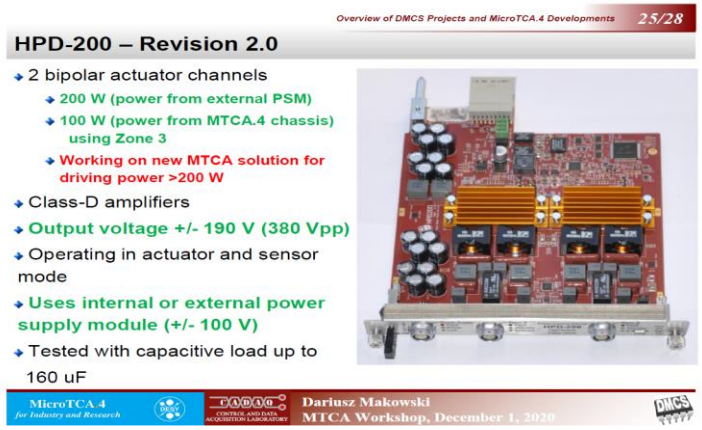
- Detector readout Visible & NIR
- Standard industrial products +
- Customized in house modules (~half/half)



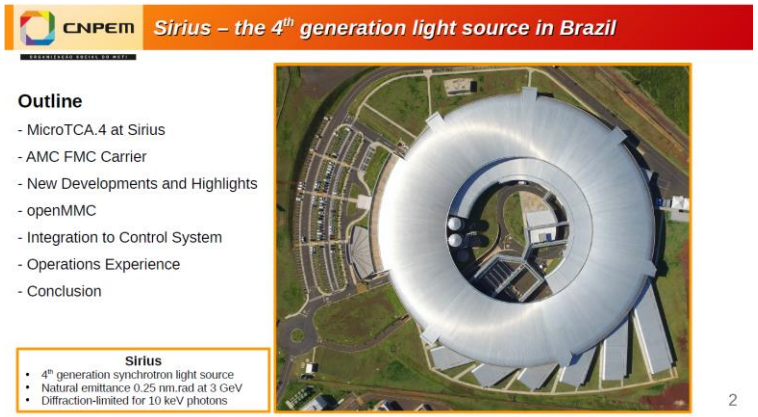
Prof. Dariusz Makowski (Uni. Lodz)



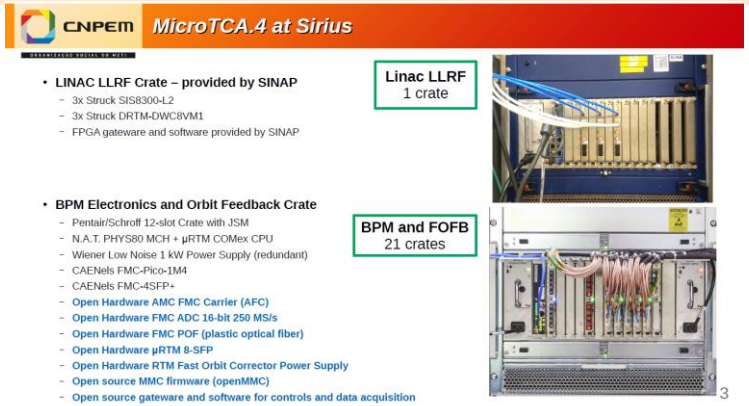
- Heavily involved in ITER
- Generic frame grabber + MMC develp.
- High voltage PZT driver for ESS



Daniel Tavares (LNLS)



- LLRF / BPM / FOFB / Fast correctors
- Mix of Open Hardware & COTS + openMMC
- Comprehensive overview on different issues obs.



Quick overview on talks in session 4

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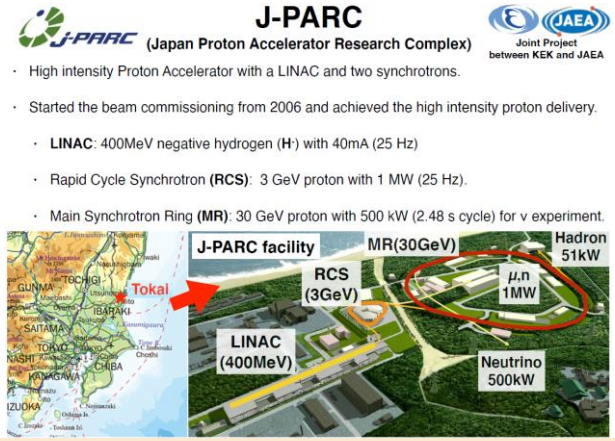
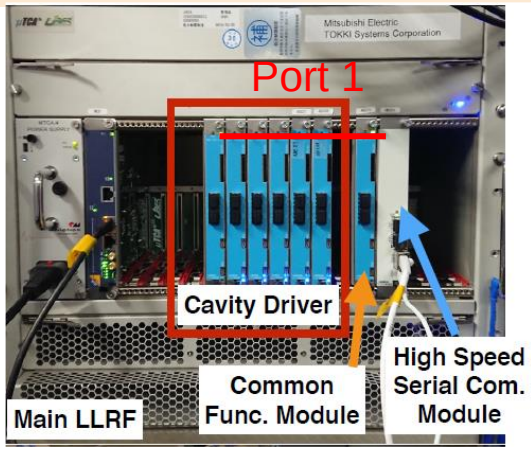
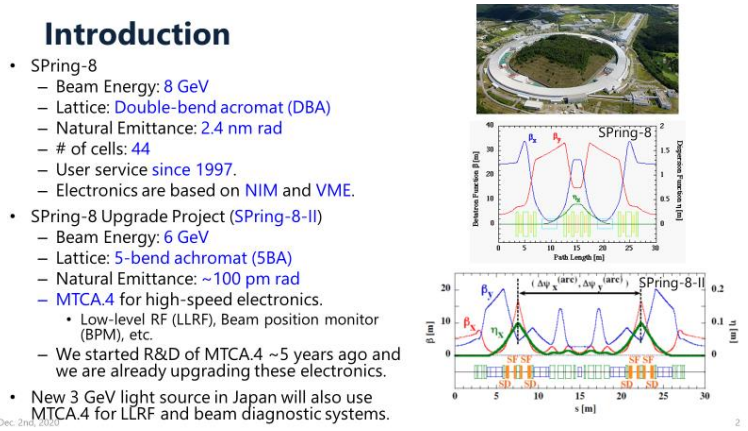
Yasuyuki Sugiyama (J-PARC)



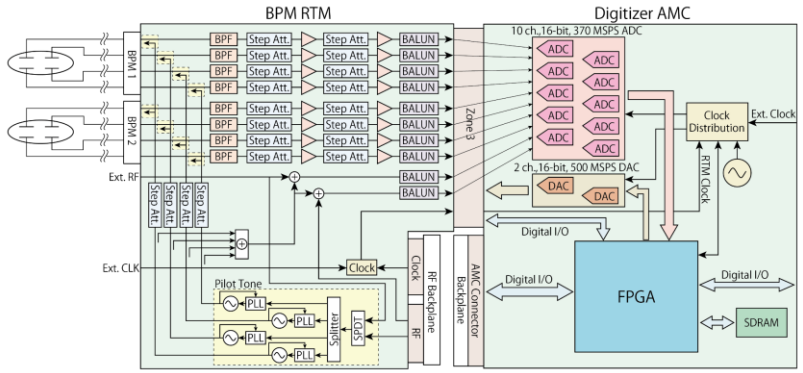
- LLRF + coupled bunch FB in MR
- VME → MicroTCA4.1 advanced design
- RF backplane + Port 1 for data transfer



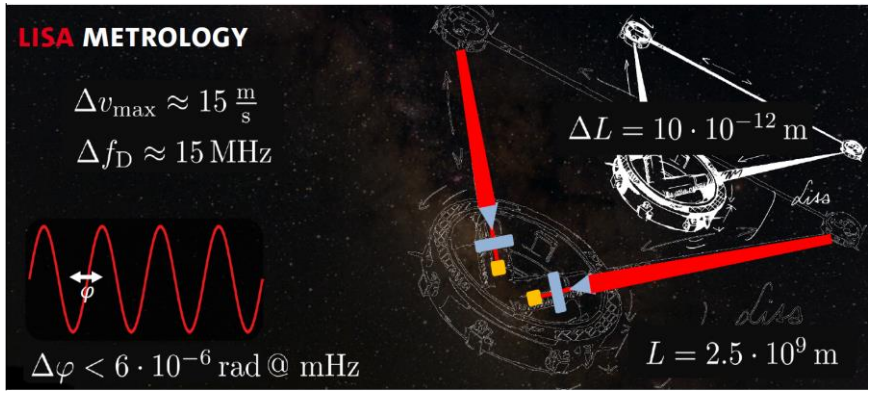
Hirokazu Maesaka (RIKEN)



- Spring-8 upgrade
- LLRF / BPMs
- Advanced MicroTCA designs

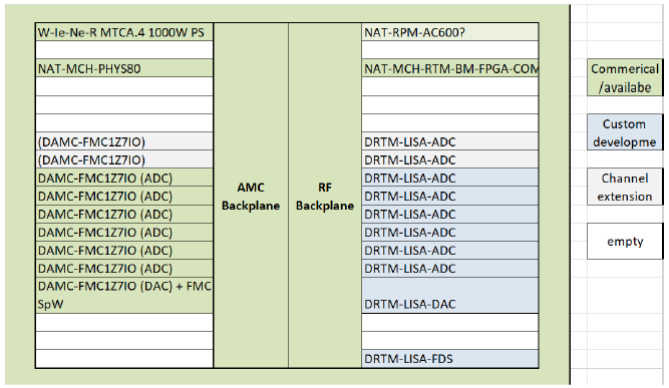


Prof. Oliver Gerberding (Uni. HH)



- LISA Ground-support Phasemeter development
- Uses MicroTCA4.1, RF Backplane, custom RTMs
- Advaced MicroTCA Design .

Preliminary design



Quick overview on talks in session 5

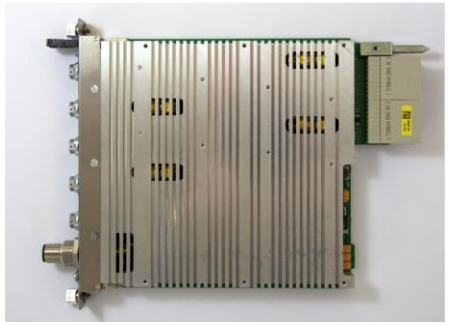
… incomplete, teaser for looking up presentations (+ update Soleil)

Simone Farina (DESY)

Next Generation SoC-based AMC Developments at DESY

- DAMC-FMC2ZUP : ZYNQ Ultrascale+ MPSoC FMC+ carrier
- DAMC-DS5G14ZUP : ZYNQ Ultrascale+ RFSoC Digitizer
- DAMC-DS812ZUP : 8 channel 800MSPS 12-bit Digitizer ZYNQ Ultrascale+ MPSoC
- DMMC-Stamp : Turnkey SoM Module Management Controller
- DAMC-FMC1Z7IO : ZYNQ-7000 GPIO extension board and FMC carrier
- DRTM-MXC : Mobile eXpress Module Carrier - Graphics carrier RTM module

Peter Jaenker (PiezoTechnics)



High-end **Low-Cost**

Hardware developments

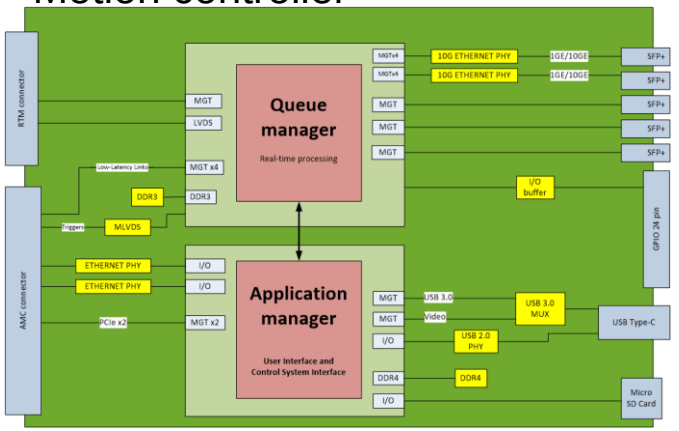
Supplementary modules

Prof. Dariusz Makowski (Uni. Lodz)

Xilinx Artix

Nikola Radakovic (DESY)

Motion controller



Quick overview on talks in session 6

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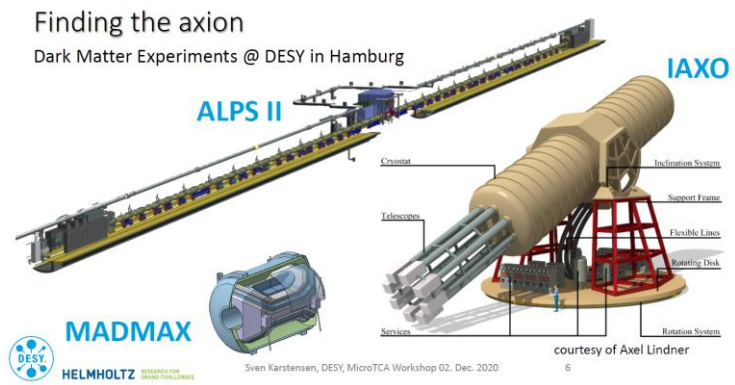
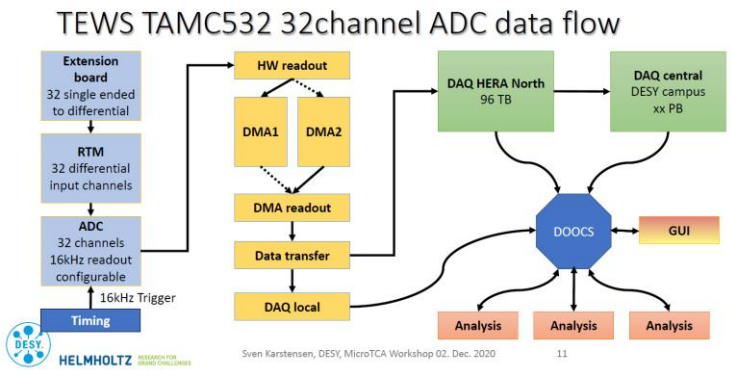
Sven Karstensen (DESY)

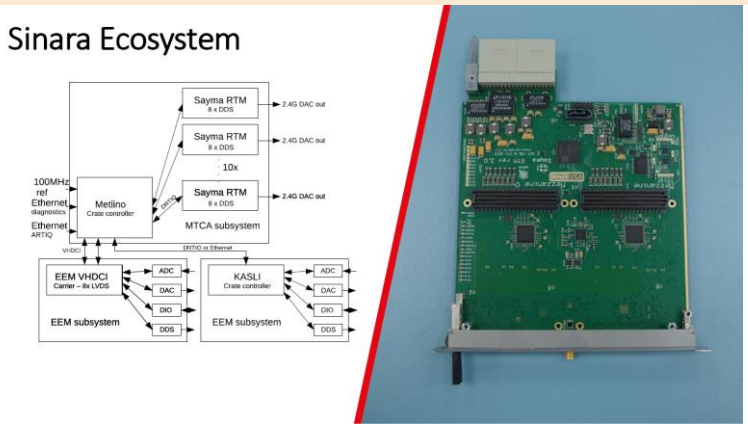


- Axion research (dark matter research)
- Significant DAQ effort, 6m continues op.
- Makes use of existing HW/SW from acc.

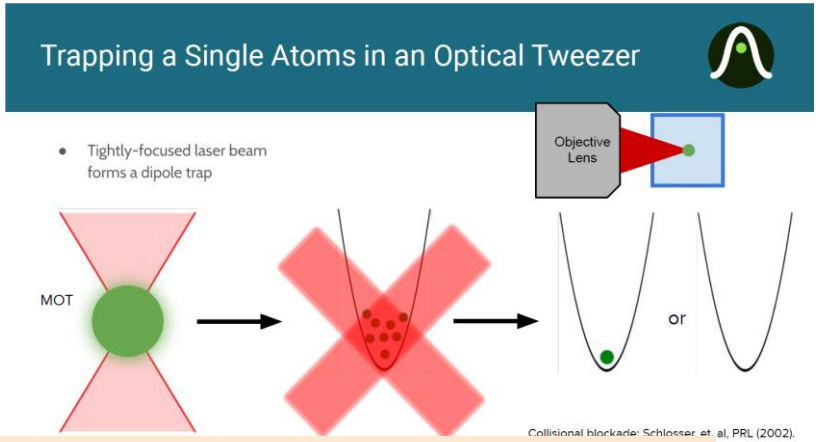


Grzegorz Kasprowicz (Cryotech)

- Requires larger control system and various modules
- Core: MicroTCA, AMC & RTM are developed
- Follow open source HW



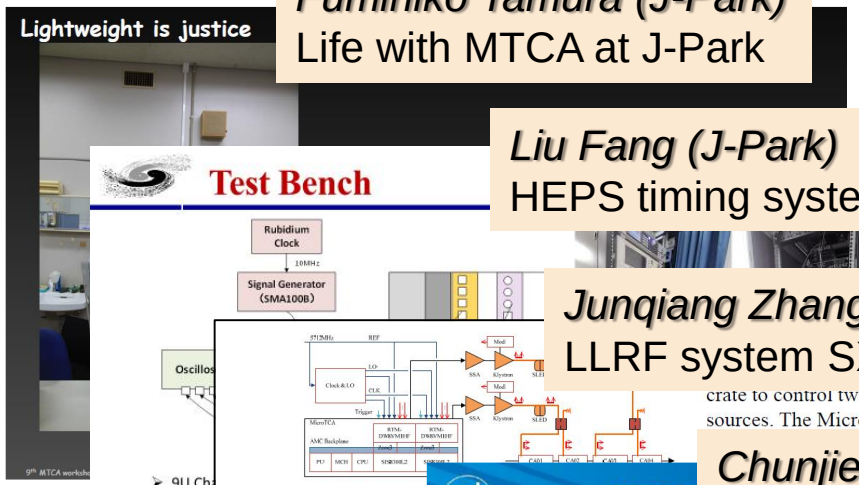
Robin Cox (Atom Computing)



- Neutral atoms traps in an array
- Specialized RF waveforms for manipulation
- COTS & Custom design (since not yet avail)

Quick overview on talks in session 7…9

… incomplete, teaser for looking up presentations



Fumihiko Tamura (J-Park)
Life with MTCA at J-Park

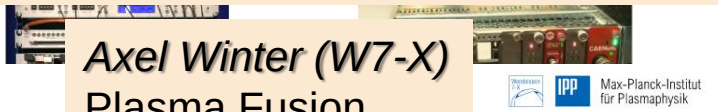
Liu Fang (J-Park)
HEPS timing system

Junqiang Zhang (SINAP)
LLRF system SXFEL

Chunjie Xie (NSRL)
LLRF HLS/IRFEL

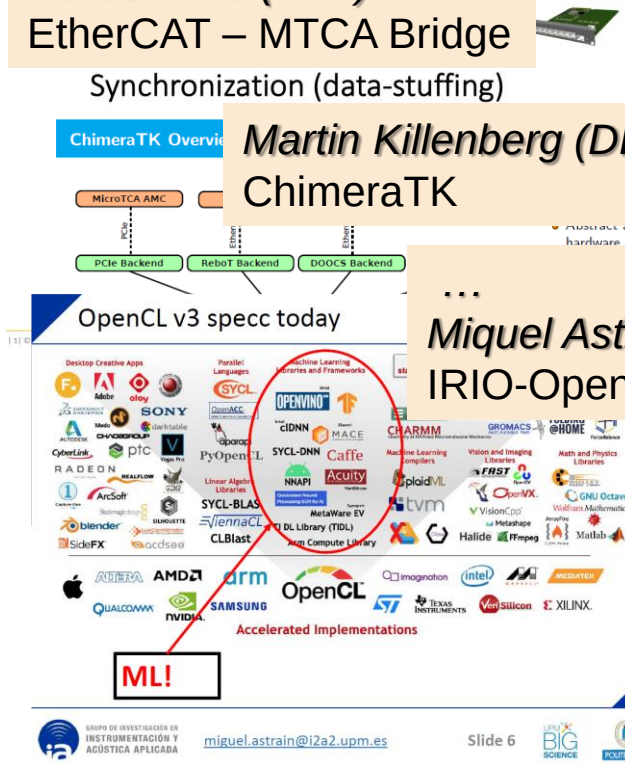
Klaus Zenker (HZDR)
LLRF CW Elbe

Stefan Duester / Martin Tolkiehn (DESY)
Photon Experiments FEL / PETRAIII



Axel Winter (W7-X)
Plasma Fusion

Herbert Erd (NAT)
EtherCAT – MTCA Bridge



Martin Killenberg (DESY)
ChimeraTK

…

Miquel Astrain (Uni. Madrid)
IRIO-OpenCL

Take away from 9th MicroTCA Workshop

- **Virtual Workshop format**
  - ➢ worked out surprisingly well (44 talks!) but **no real substitute for face-to-face**
  - ➢ **Q&A session** was very important and triggered discussion
  - ➢ Exhibition & **Industry** reasonable well integrated (unlike to other VC)
- **Ecosystem & community**
  - ➢ Within 12 month **many new developments** have take place & being presented
  - ➢ Significantly **more "expert"** are now around the world e.g. starting new /own developments
  - ➢ **New communities & newcomers** joining (beyond accelerator community)
  - ➢ **Local WS** for community expansion and dissemination of MicroTCA standard important
- **Hot topics:**
  - ➢ SoC's / SW & FW Sharing / Integration external infrastructure / IMPI for FMC / Interop. issues
  - ➢ Starting: Real-time Machine Learning on edge computing & Quantum Computing appl.

Participation of Industry Exhibitors

Thanks to

Advisory committee:

Kay Rehlich (Chair)	DESY
Holger Schlarb (Chair)	DESY
Henrik Carling	ESS
Paul Chu	IHEP, China
Tobias Hoffmann	GSI
Thomas Holzapfel	powerBridge
Christian Ganninger	nVent - Schroff GmbH
Heiko Koerte	N.A.T.
Rong Liu	Beijing DAQ Technology Co. Ltd
Dariusz Makowski	Lodz University of Technology
Charles Roberts	ORNL
Ian Shearer	Vadatech
Fumihiko Tamura	J-PARC Center, Japan
Axel Winter	MPI Plasmaphysik
Zeran Zhou	NSRL, USTC, China

Valuable input for shaping the workshop!!!

Try to cover ecosystem adequately:

Regions

&

Institutes

&

Communities

&

Industry

Home | Contributions | Virtual Industrial Exhibition | Past Workshops

The 10th MicroTCA Workshop for Industry and Research will be held from 7-9 December 2021 at DESY.

The main topics of the workshop are:

- Applications in research facilities
- Applications in industry
- New Products
- Future of standard and interoperability
- Software and firmware

The registration will open in September 2021.