This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 730871.

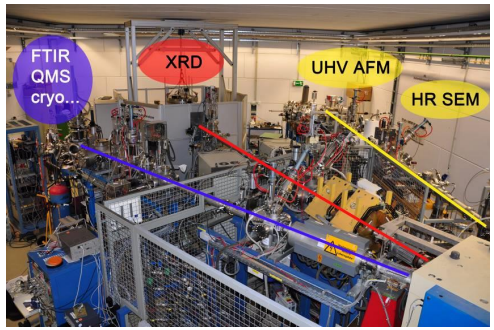
Access to material testing facilities (WP10)

ARIES kick-off, CERN, 4th-5th May 2017

Daniel Severin (GSI), Adrian Fabich (CERN)

WP10 – Access to Material testing facilities

- Task 10.1 – HiRadMat at CERN
  - Leader: Adrian Fabich
  - Yacine Kadi (from summer 2017)



- Task 10.2 – M-branch (Unilac) at GSI
  - Leader: Daniel Severin

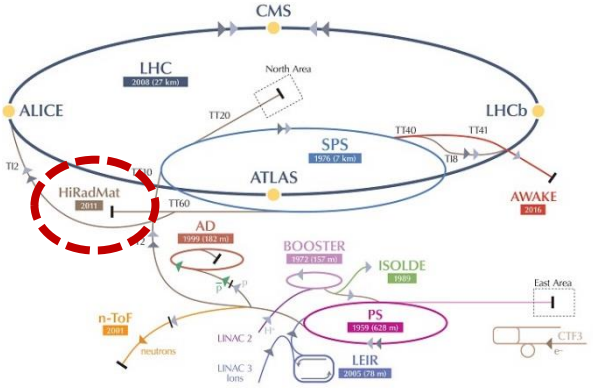
- For material testing in in-beam tests
- Providing Trans-National Access (TNA)

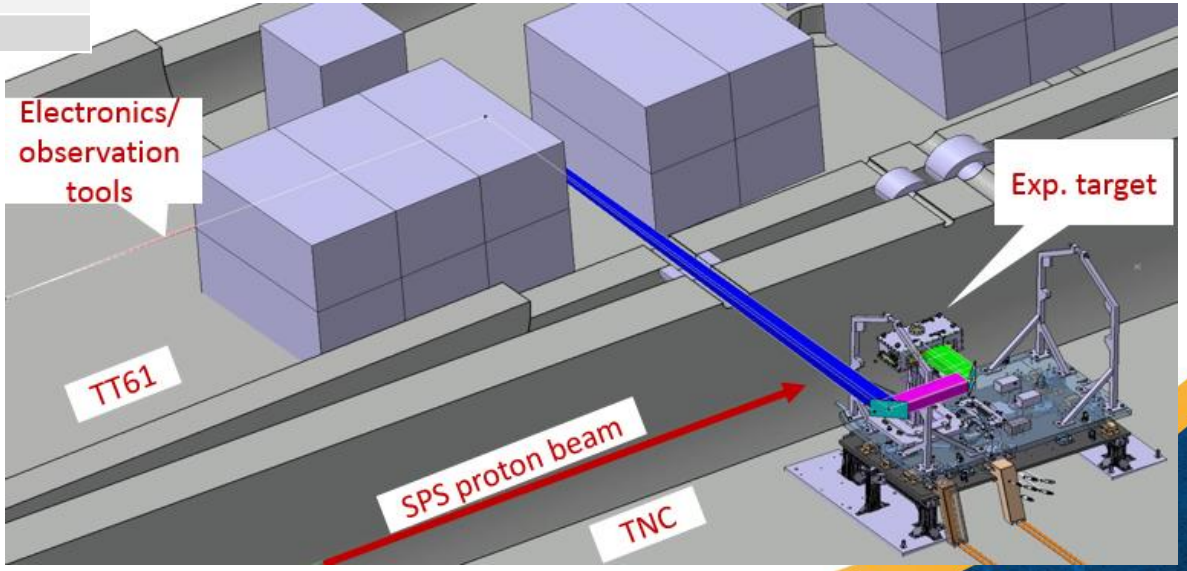
HiRadMat
High-Radiation to Materials

- **Dedicated facility for studying the impact of intense pulsed beams on materials:**
  material damage, material vaporization, thermal management, radiation damage, thermal shock, beam induced pressure waves

	Protons	Heavy ions (Pb^{82+})
Beam energy	440 GeV	173 GeV/u
Bunches/pulse (max)	288	52
Pulse intensity (max)	$5\ 10^{13}$	$4\ 10^{9}$
Bunch spacing	25, 50, 75 or 150 ns	100 ns
Pulse length (max)	7.2 µs	5.2 µs
Beam spot	variable around 1 mm^2	
Pulse energy (max)	3.4 MJ	21 kJ

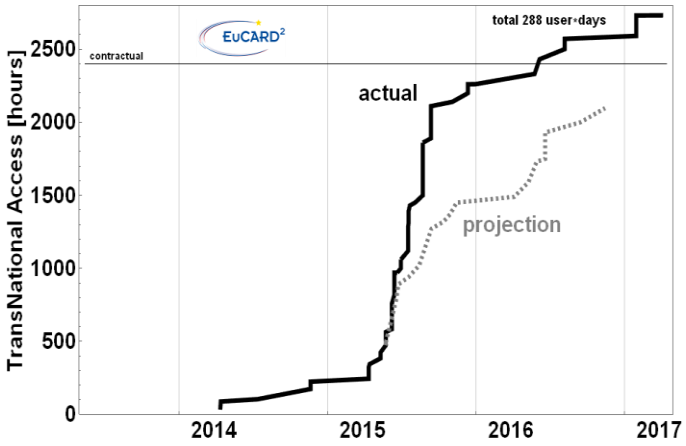
http://cern.ch/hiradmat

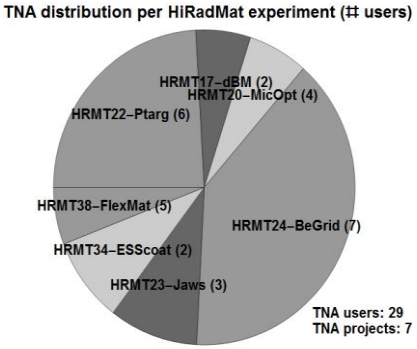


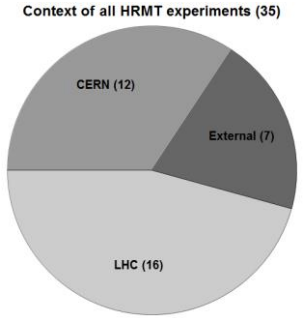


TransNational Access

- Experienced from EuCARD/EuCARD2







In ARIES, the accounting will be based on SPS cycle time for HiRadMat (not user*days).

- There is some administrative effort, which pays off for more externals using the facility
  - Registration
  - Reimbursement

Thanks for the continuos support from the CERN-EU office.

User Selection Panel

Two stage selection process:

- HiRadMat Scientific Board
  - International Board members (SNS, PSI, BNL, CERN)
- HiRadMat Technical Board
  - CERN experts on operation, safety and radiation protection

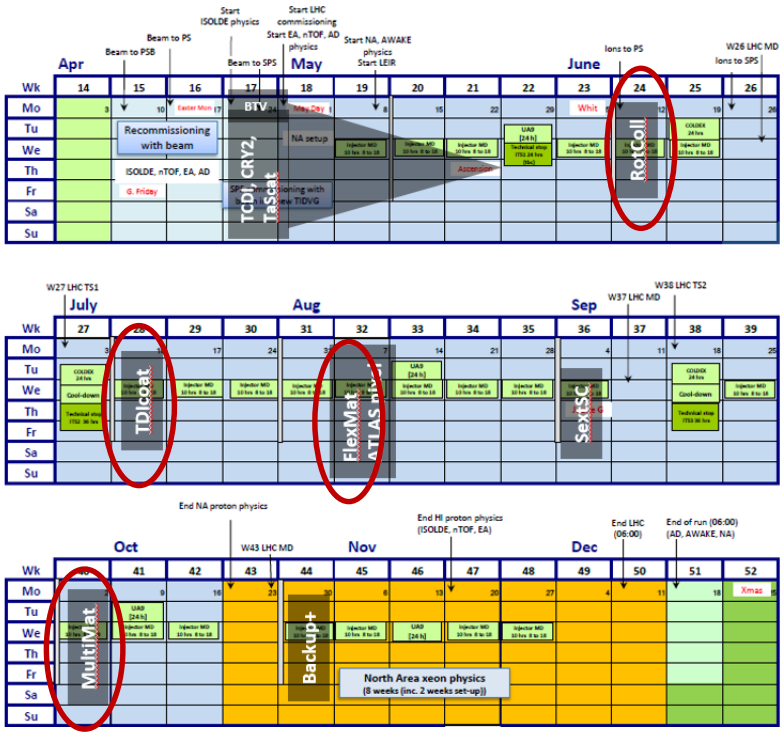
- Call for 2018 beam time applications by this summer

- **Scientific dissemination:**
  - related publications with acknowledgement

  - Pro-active and continuous reminder on the acknowledgement

- **We support the approach of one internal note requested from each experiment – as a preparation of the final publication**

HiRadMat beam schedule in ARIES



4 experiments with TNA

- FlexMat (GSI): the dynamic response of pre-irradiated carbon composites
- ATLASpixel (INFN): LHC detectors, damage limit
- TDIcoat: testing LHC collimator coating
- MultiMat collimator materials

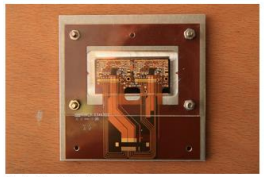


Fig.1: Pixel Module.

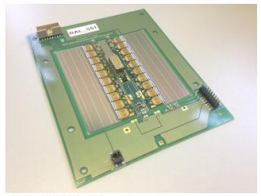
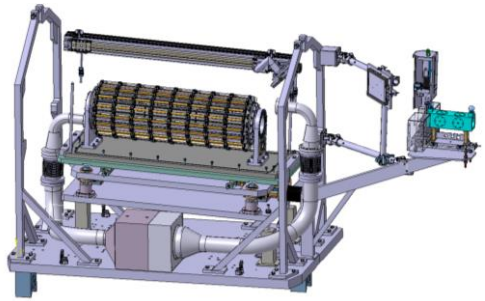
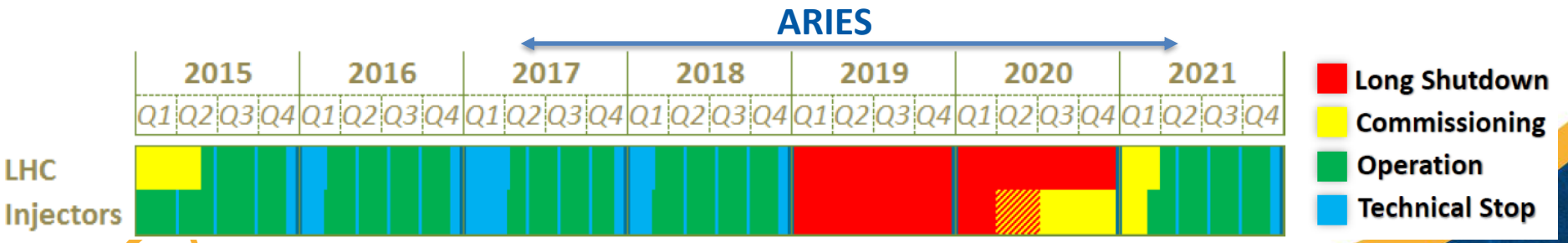


Fig.2: Strip module.

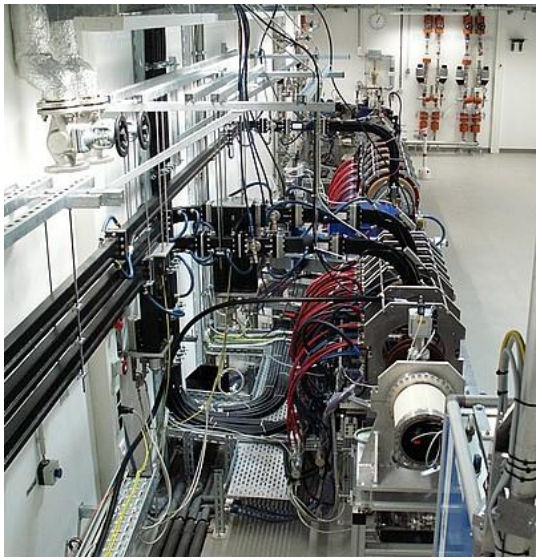




Metrological Electron Beam Facility

at PTB Germany (www.ptb.de)

- Research LINACs (2)
  - Medical LINACs (2)
  - and a ^{60}Co source (132 TBq)



Energy range:	0.5-50 MeV
Energy width	
0.5 MeV < *E* < 5 MeV:	≥ 4 keV
5 MeV < *E* < 20 MeV:	≥ 20 keV
E > 20 MeV:	≥ 40 keV
Beam diameter:	< 3 mm
Beam power	
Maximum:	1 kW
0.5 MeV to 10 MeV:	≥ 1 W
6 MeV to 50 MeV:	≥ 100 W
Pulse repetition freq.	1-100 Hz
Pulse width:	3 µs
Pulse current:	< 200 mA

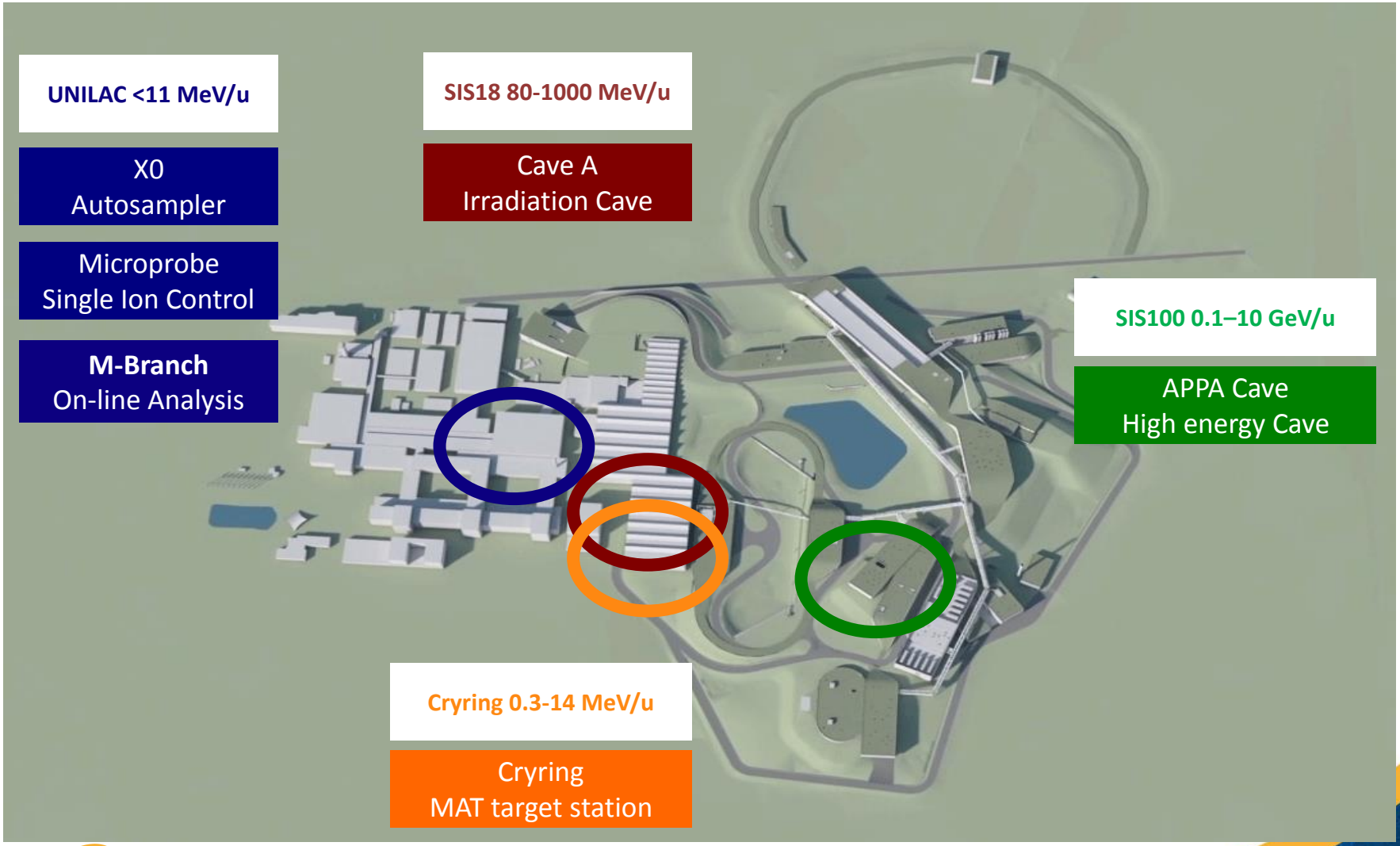
- Complementary and free-of-charge access
- photon and electron beams
- **for material testing**

E.g. irradiation of radiation-sensitive electronics by an accurate measured dose of high energy photon or electron radiation studying radiation hardness.

- **Availability of post-irradiation expertise**

See also DB on irradiation facilities at http://cern.ch/irradiation-facilities

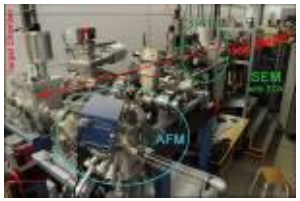
MAT facility at GSI/FAIR



MAT facility at GSI

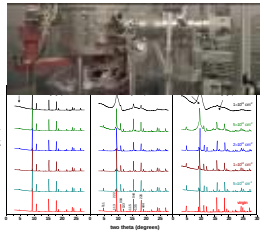
M-Branch
In-situ and On-line Analysis of Irradiated Material

M1
Microscopy



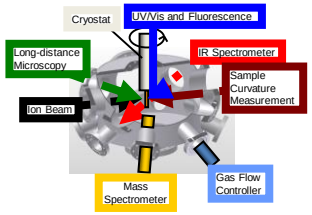
University of Stuttgart
University of Duisburg Essen

M2
X-Ray Diffraction



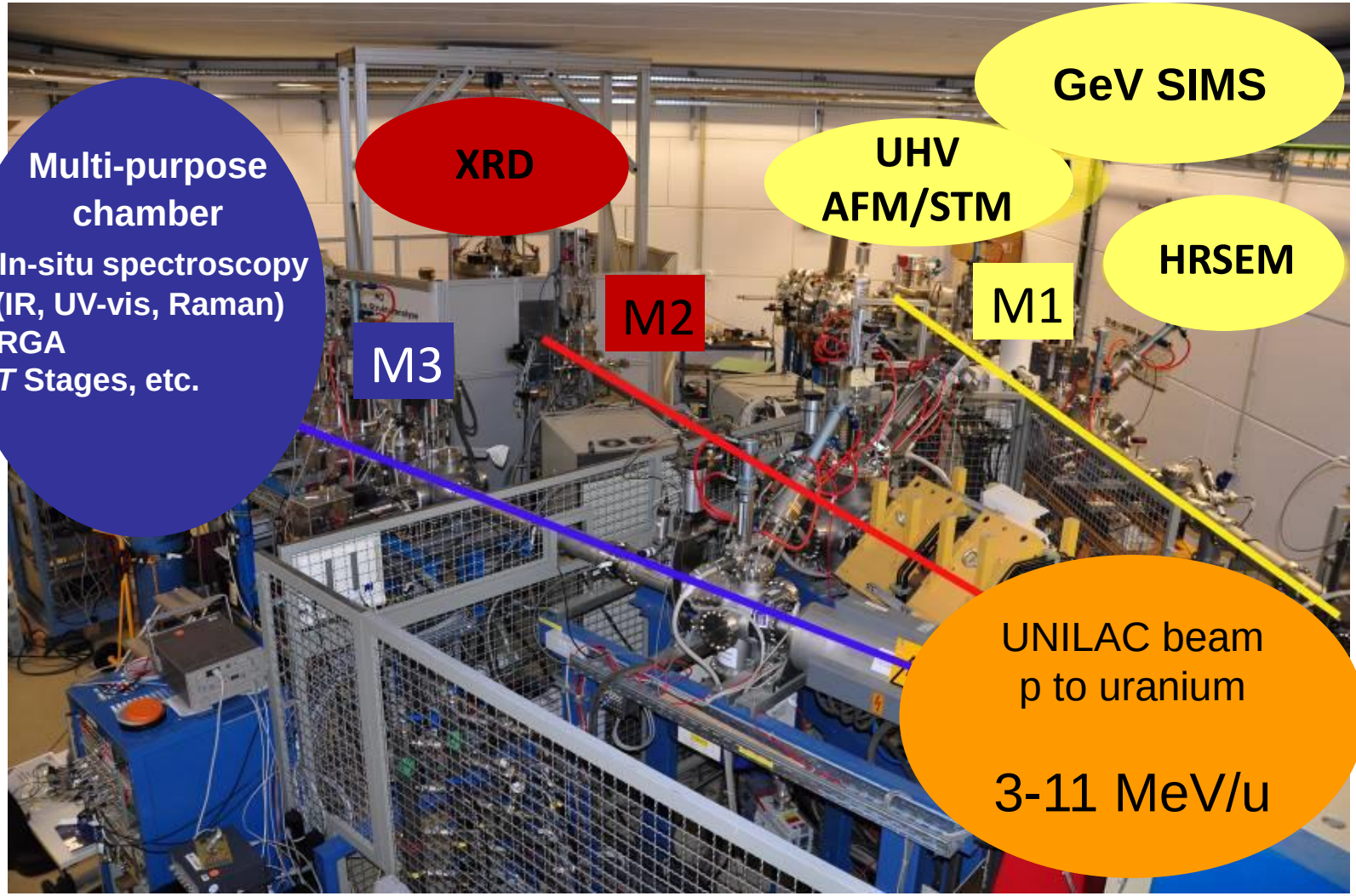
Helmholzzentrum Berlin / GSI

M3
Multi-Analysing Chamber



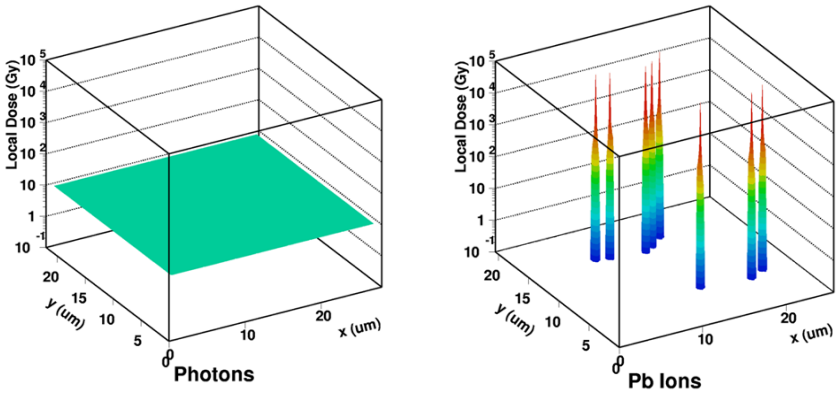
Universities of Darmstadt, Dresden
Göttingen, Jena, Heidelberg

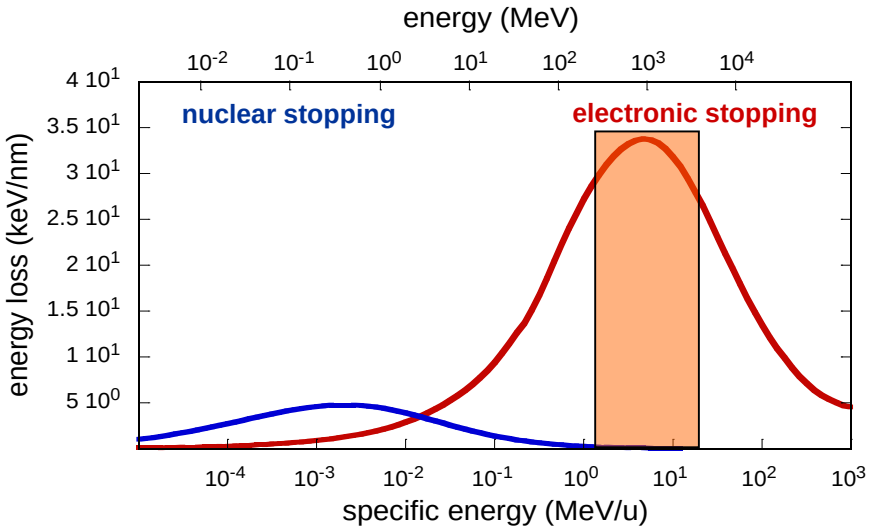
M-branch overview



What to investigate

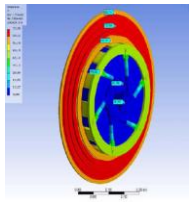
High energy density

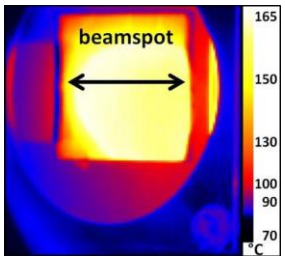


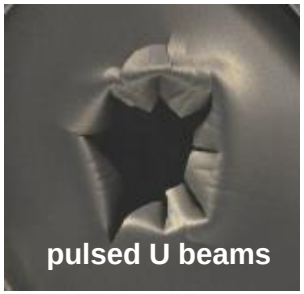


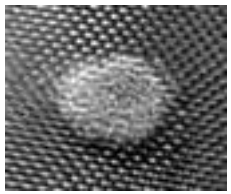
Material challenges at next generation accelerators

- **desorption (vacuum problems)**
- **insulating components**
- **high-dose materials**
  - target wheel (Super-FRS)
  - beam dumps
  - collimators, etc.

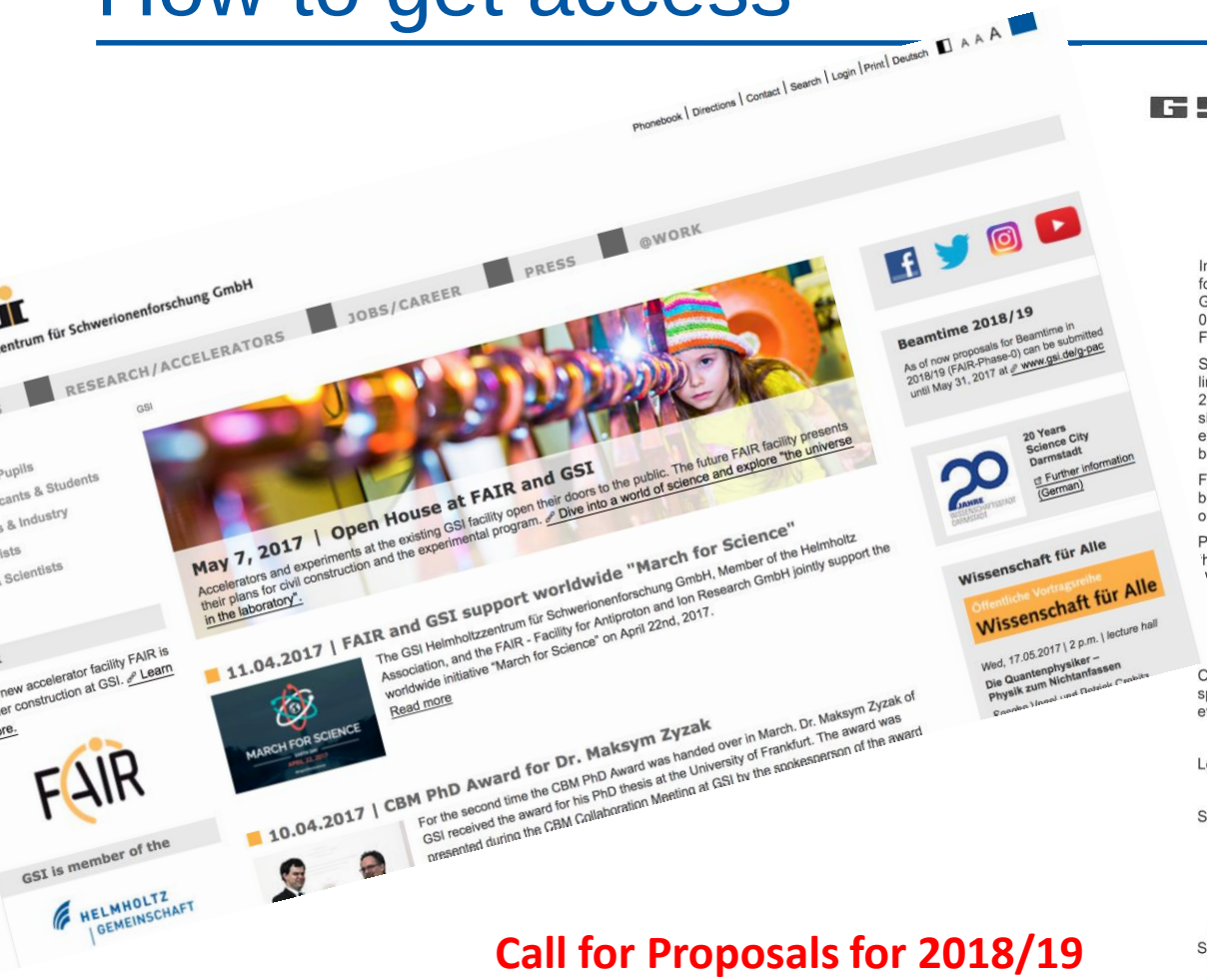


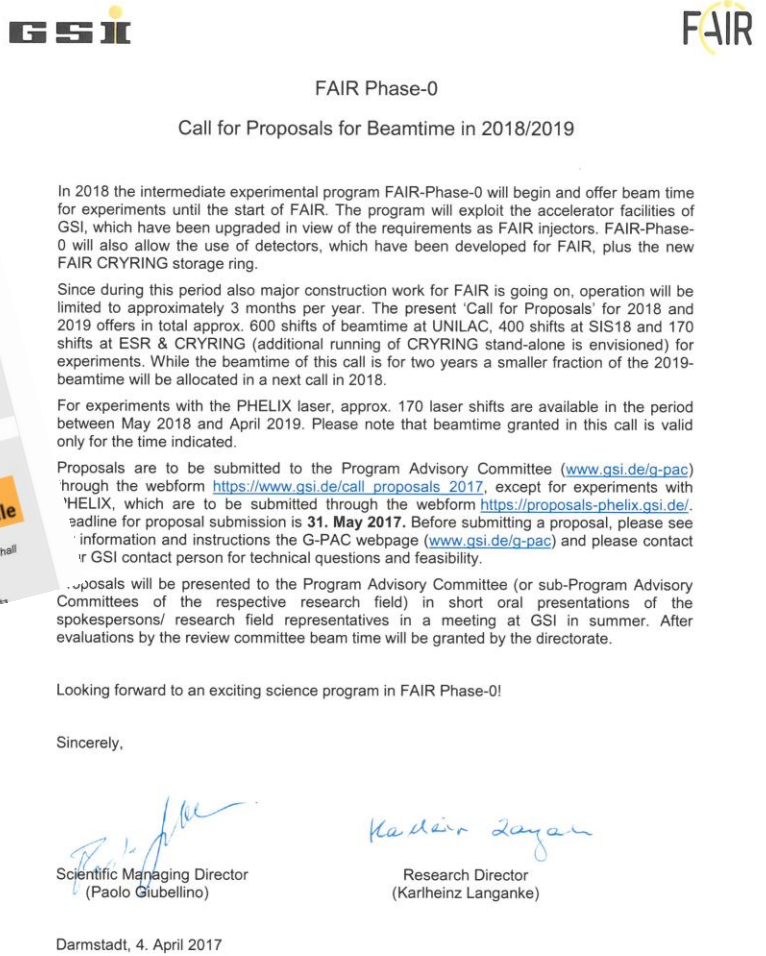






How to get access





FAIR Phase-0

Call for Proposals for Beamtime in 2018/2019

In 2018 the intermediate experimental program FAIR-Phase-0 will begin and offer beam time for experiments until the start of FAIR. The program will exploit the accelerator facilities of GSI, which have been upgraded in view of the requirements as FAIR injectors. FAIR-Phase-0 will also allow the use of detectors, which have been developed for FAIR, plus the new FAIR CRYRING storage ring.

Since during this period also major construction work for FAIR is going on, operation will be limited to approximately 3 months per year. The present 'Call for Proposals' for 2018 and 2019 offers in total approx. 600 shifts of beamtime at UNILAC, 400 shifts at SIS18 and 170 shifts at ESR & CRYRING (additional running of CRYRING stand-alone is envisioned) for experiments. While the beamtime of this call is for two years a smaller fraction of the 2019-beamtime will be allocated in a next call in 2018.

For experiments with the PHELIX laser, approx. 170 laser shifts are available in the period between May 2018 and April 2019. Please note that beamtime granted in this call is valid only for the time indicated.

Proposals are to be submitted to the Program Advisory Committee (www.gsi.de/g-pac) through the webform https://www.gsi.de/call_proposals_2017, except for experiments with PHELIX, which are to be submitted through the webform https://proposals-phelix.gsi.de/. Deadline for proposal submission is **31. May 2017.** Before submitting a proposal, please see information and instructions the G-PAC webpage (www.gsi.de/g-pac) and please contact your GSI contact person for technical questions and feasibility.

Proposals will be presented to the Program Advisory Committee (or sub-Program Advisory Committees of the respective research field) in short oral presentations of the spokespersons/ research field representatives in a meeting at GSI in summer. After evaluations by the review committee beam time will be granted by the directorate.

Looking forward to an exciting science program in FAIR Phase-0!

Sincerely,

Scientific Managing Director
(Paolo Giubellino)

Research Director
(Karlheinz Langanke)

Darmstadt, 4. April 2017

Call for Proposals for 2018/19
Deadline 31st of May