

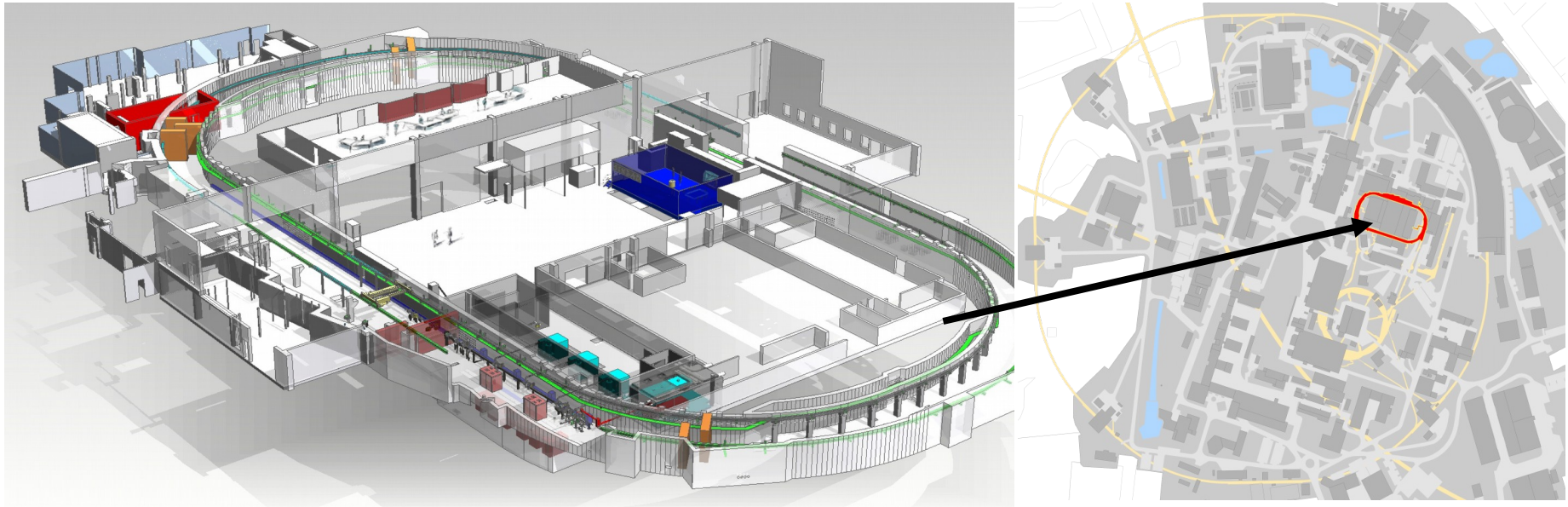


Status & plans

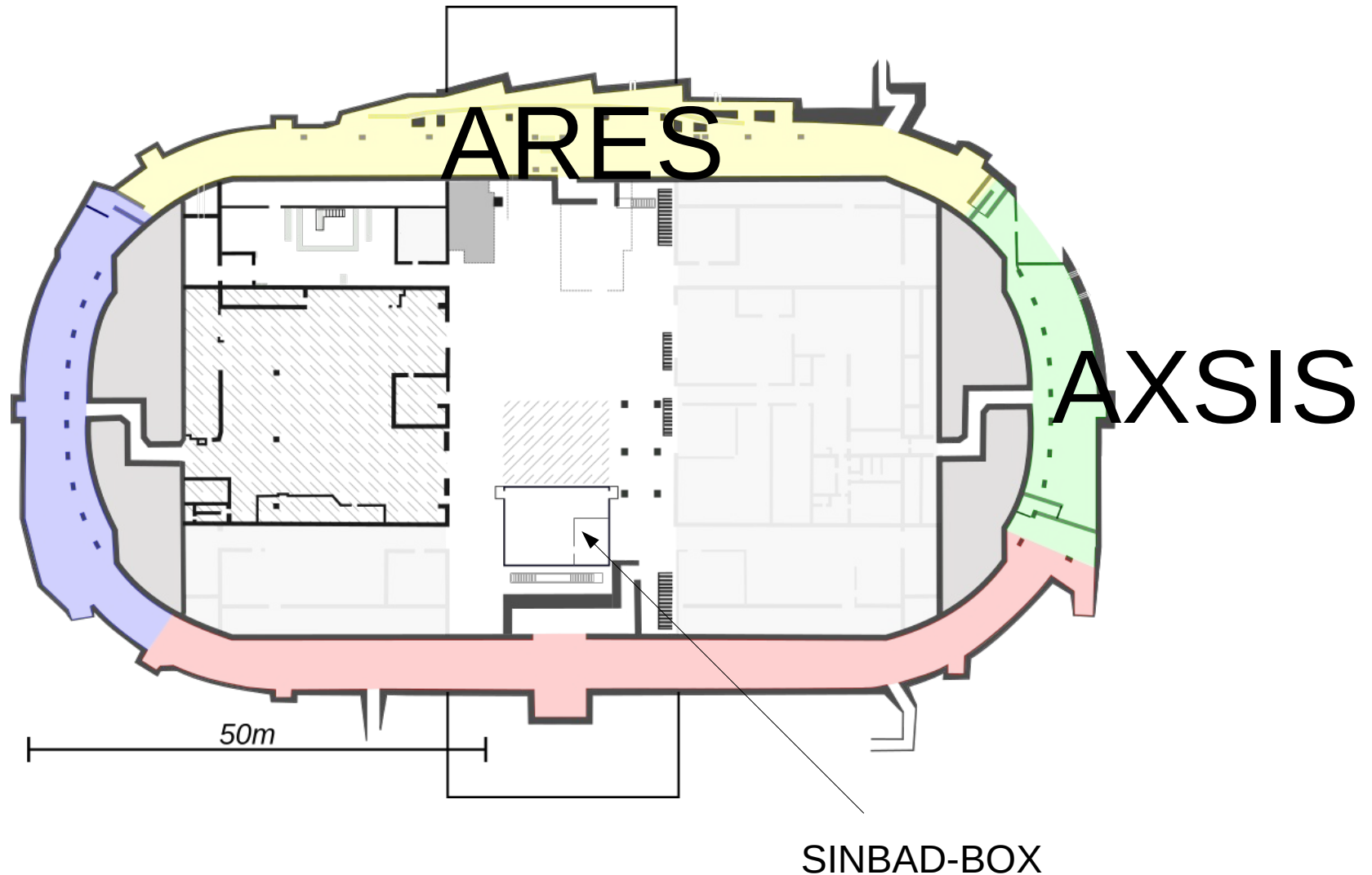
Ulrich Dorda
DESY, MPY-1, 22.02.2019

SINBAD

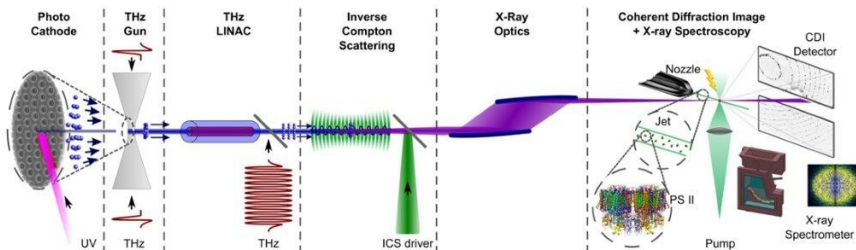
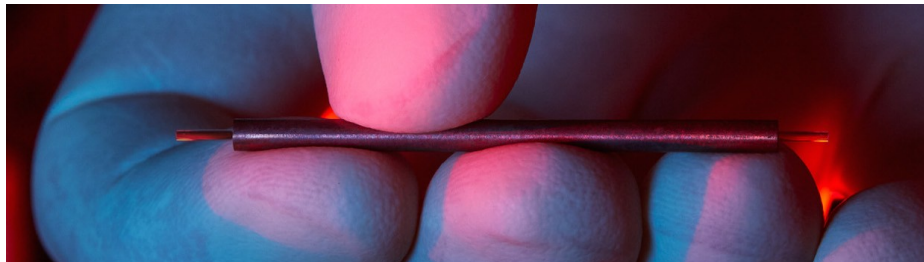
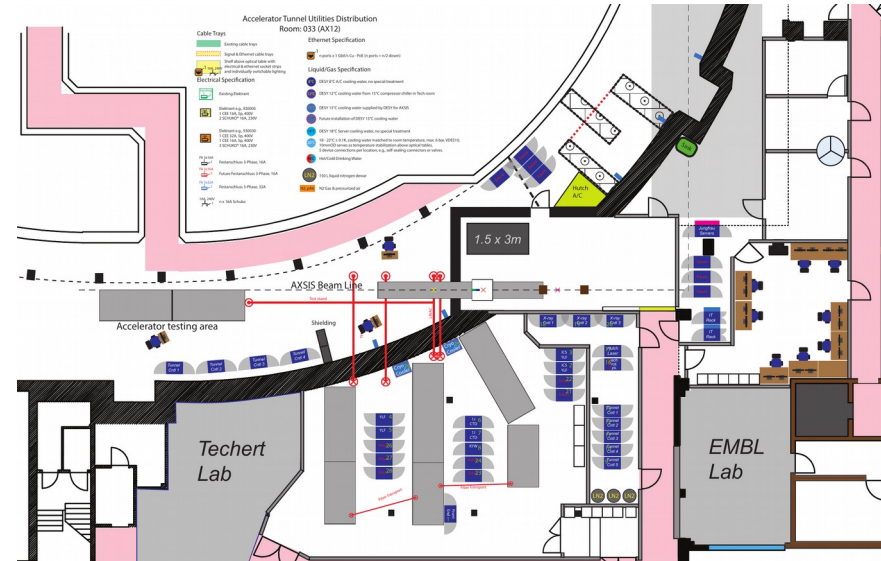
- **Framework for all accelerator R&D related activities in the former DORIS tunnel and associated areas**
- Topics:
 - ultra-fast science R&D (fs to as-regime electron pulses)
 - high gradient accelerator development (various laser-driven approaches)
- Multiple independent experiments
- Based on DESY know-how and many collaborations!



The 4 SINBAD sectors and the two initial experiments



- Collaboration of the groups of 4 Pis
 - Lasers & Accel.: F. Kaertner, R. Assmann
 - X-ray & Bio.: H. Chapman, P. Fromme
- Funded by an ERC synergy grant
- Lasers → THz → Electrons → X-rays → Users
- Hosted at SINBAD & neighboring former Hasylab user-areas.
- Target electron beam parameters: 10 -20 MeV, sub pC charge



ARES-linac

Pl: B. Marchetti

- Normal conducting S-band electron linac for the production of ultra-short bunches
- Located in „yellow area“
- 100 MeV, 0.5-200 pC, single pulse @ 50Hz, few fs / sub-fs, norm. emittance < 0.5 mm*mrad
- Upgrade plans for many years to come (ATHENA)



SINBAD-ARES

Status

- RF-conditioning of Gun has started mid Jan 2019
- Linac -stage installation next week

2 Kontrollraeume

- Im BKR
- Lokal in der SINBAD-Box

Kontakt Personen:

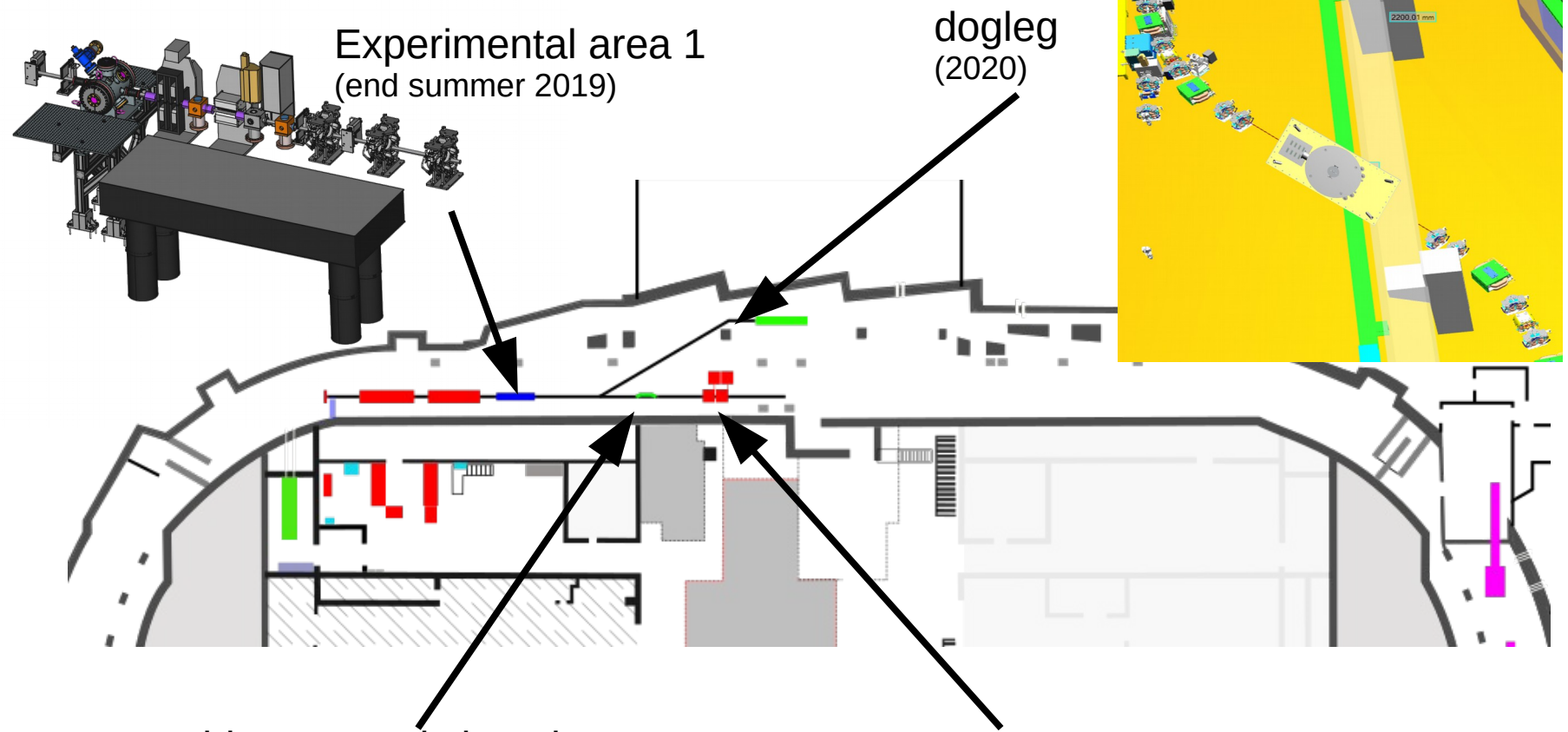
- Ulrich Dorda
- B. Marchetti (Haupt-SSB)
- Florian Brukart (SSB)
- Eva Panovski
- Stefan Baark (MEA) for crane etc.

Access & more information

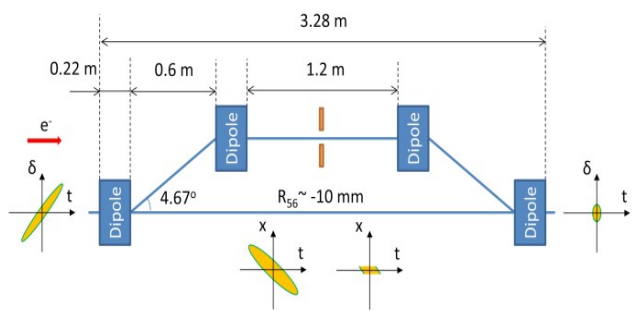
- MPS - beam permission etc right at tunnel entrance, BKR only needed for ZZ
- sinbad-wiki@desy.de (DESY network only)



Upcoming SINBAD-ARES extensions



Movable, magnetic bunch compressor (2020)



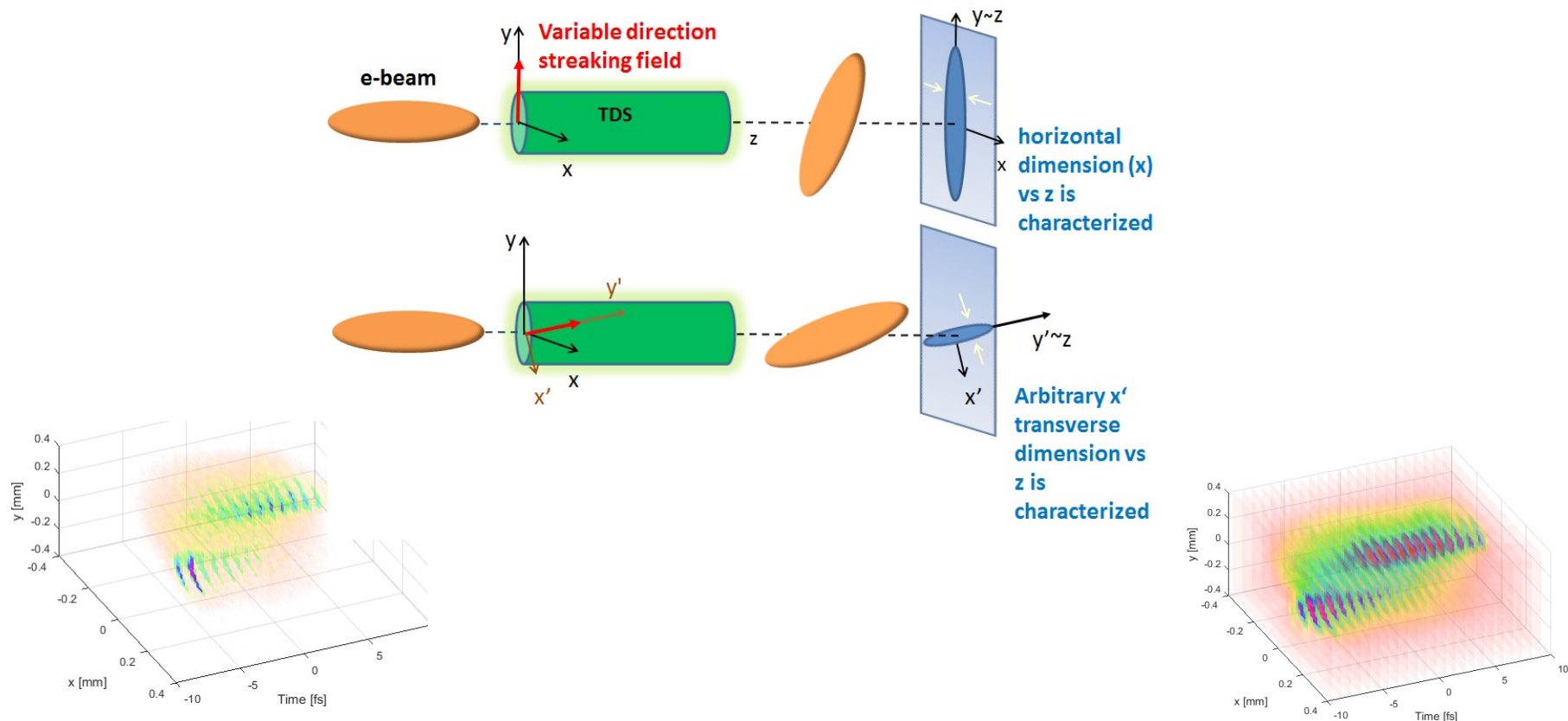
X-band TDS (2020)



PolariX Collaboration, Photo: PSI

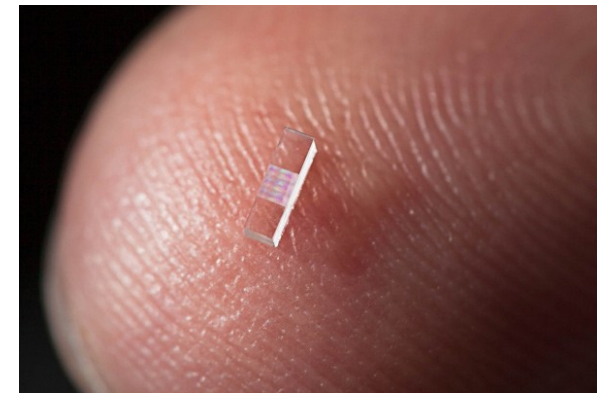
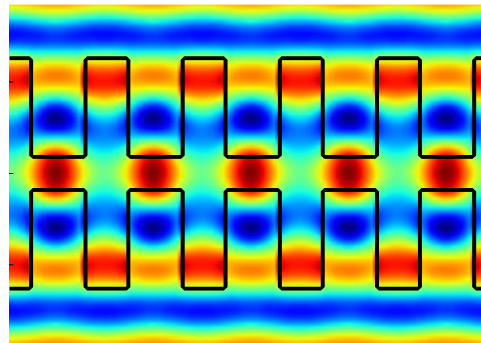
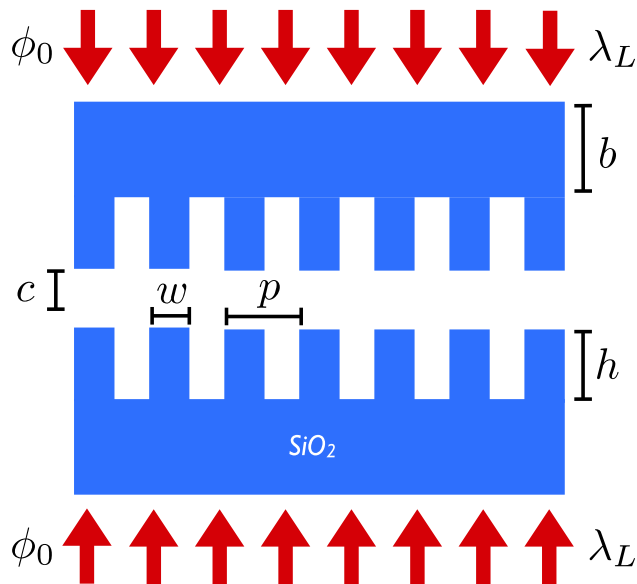
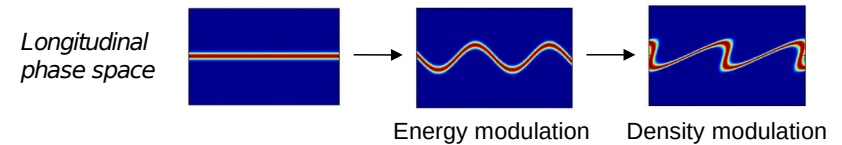
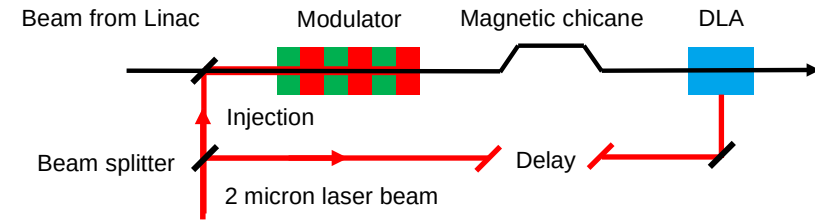
Experiment examples ½ - Polarix

- Phase space tomography using X-band TDS with variable polarization
- PolariX collaboration with CERN & PSI
- Fs time resolution



Experiment examples 2/2: ACHIP

- Dielectric laser acceleration (DLA)
- Part of the Accelerator on a Chip international program (ACHIP)
- 2 μ m laser \rightarrow 2 μ m structures
- First experiments fall 2019



ATHENA overview

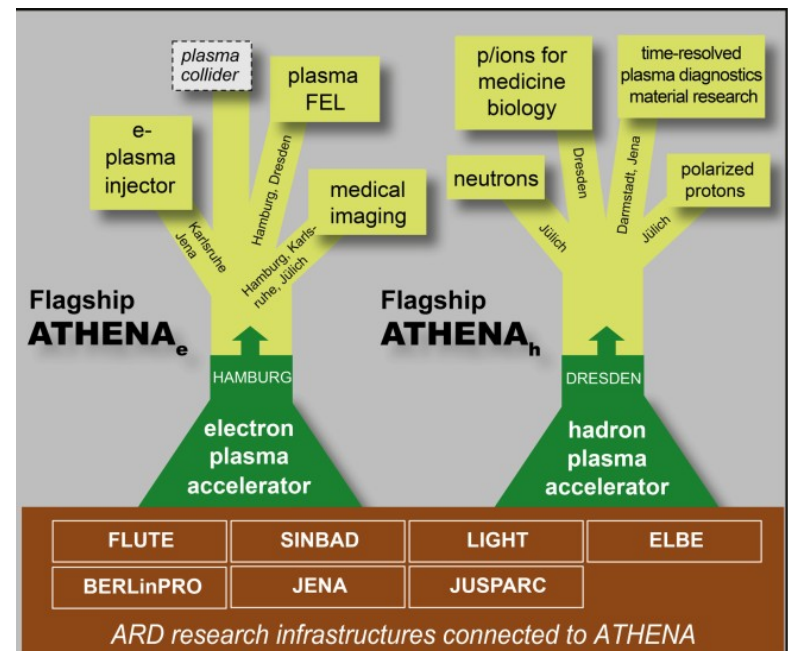


ATHENA

- Joint **request** of 7 Helmholtz centers for Helmholtz strategic investment funds
 - coordinated by R. Assmann (DESY) & U. Schramm (HZDR)
- “ATHENA ***provides the infrastructure*** required for ***bringing compact and cost-effective plasma accelerators to user readiness***. Flagship projects will be set up in Hamburg (electrons) and Dresden (hadrons). Applications for science, medicine and industry will be developed in all centers.”
- ATHENA^e flagship will be hosted at SINBAD.
- DESY part 11.5ME over 4 years
- Submission done in 2015, approved in 2018
- Funding period: 2018-2021
- Will add a plasma stage and allow upgrading the linac with e.g. X-band transverse deflecting RF systems

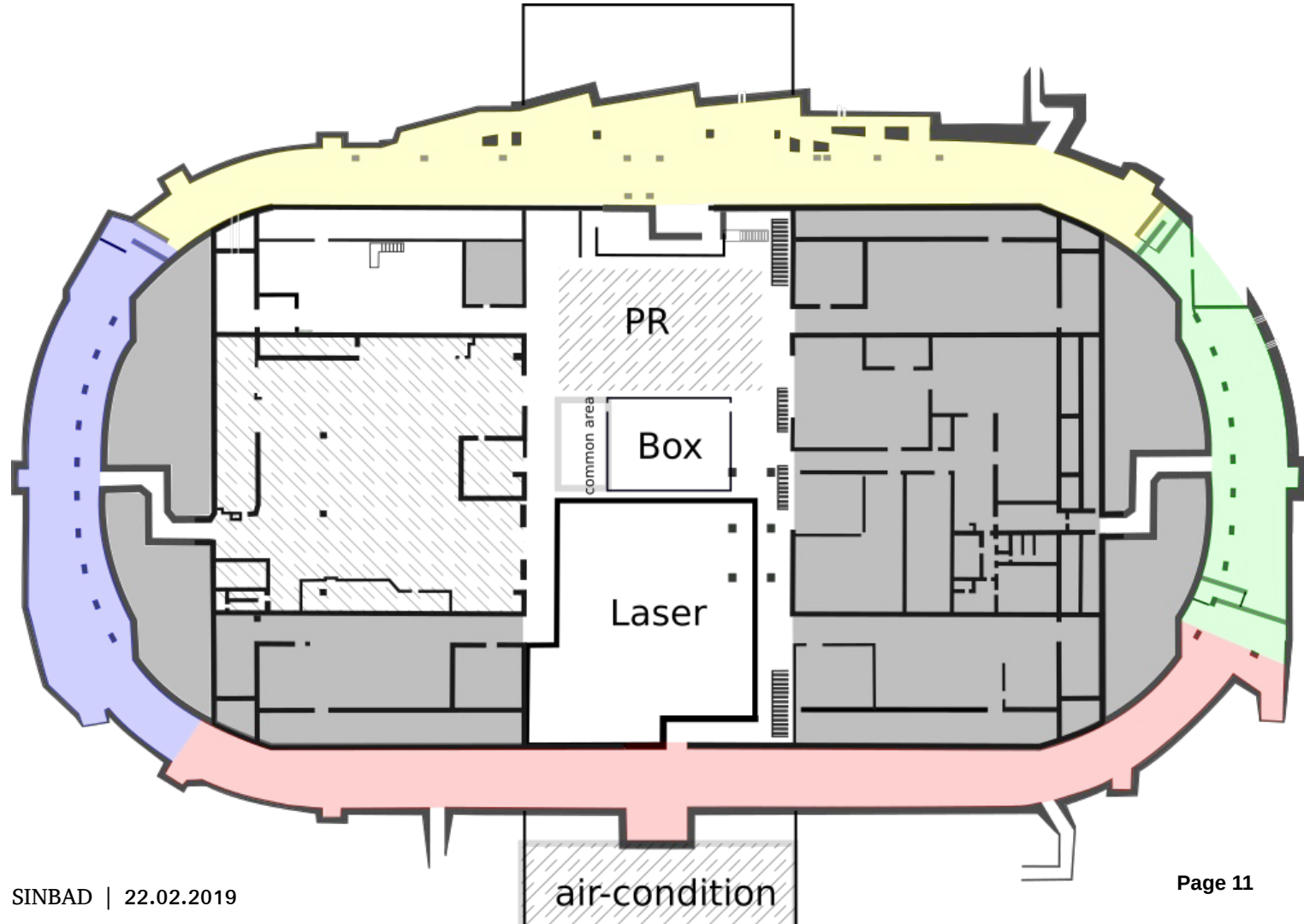


Athena is a Helmholtz-initiative, but we will strongly rely on our partners, e.g.

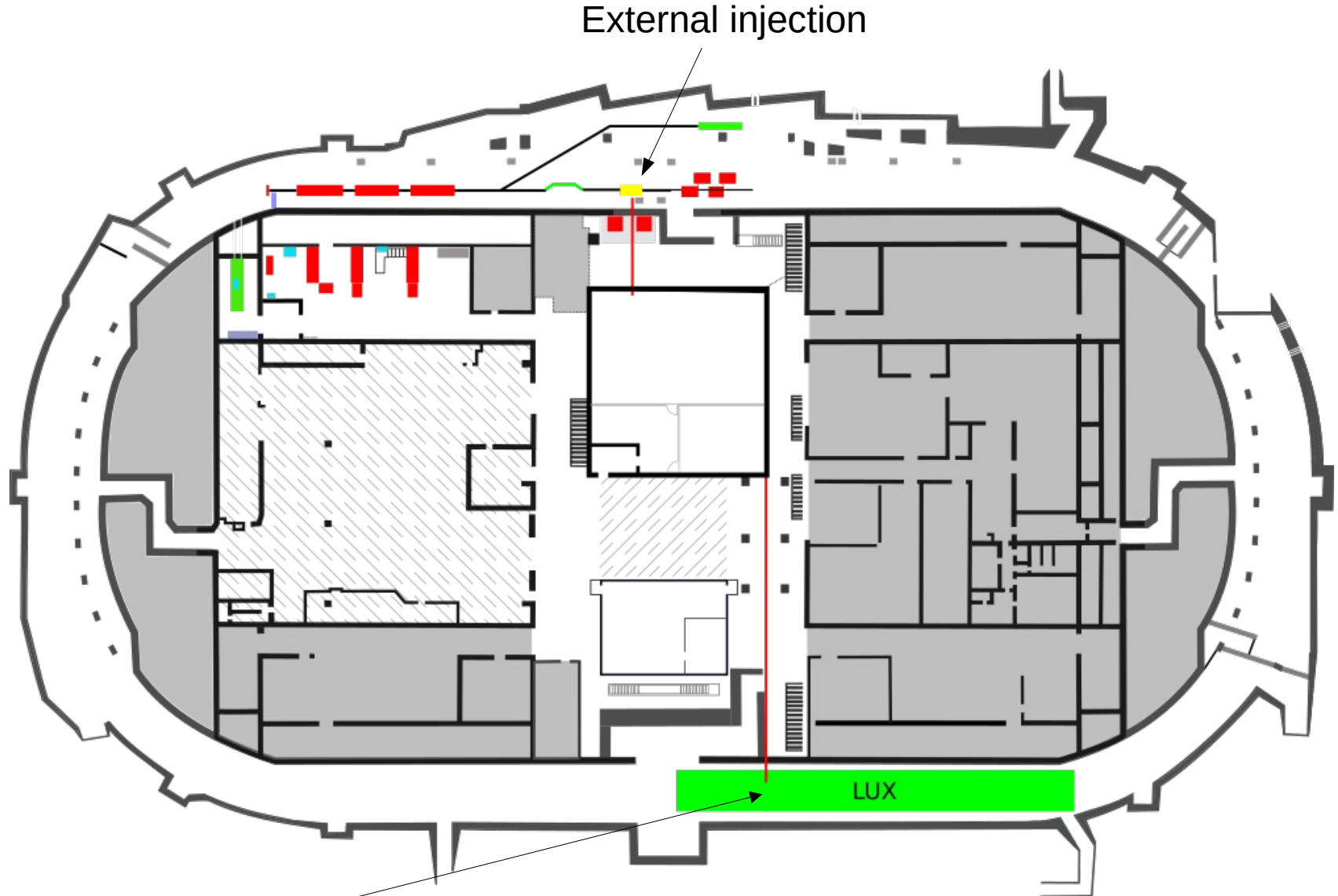


ATHENAe laser lab

- Planning ongoing
- Construction until end 2020
- Will host ANGUS (R. Maier, UHH), KIT-40TW laser, development area,

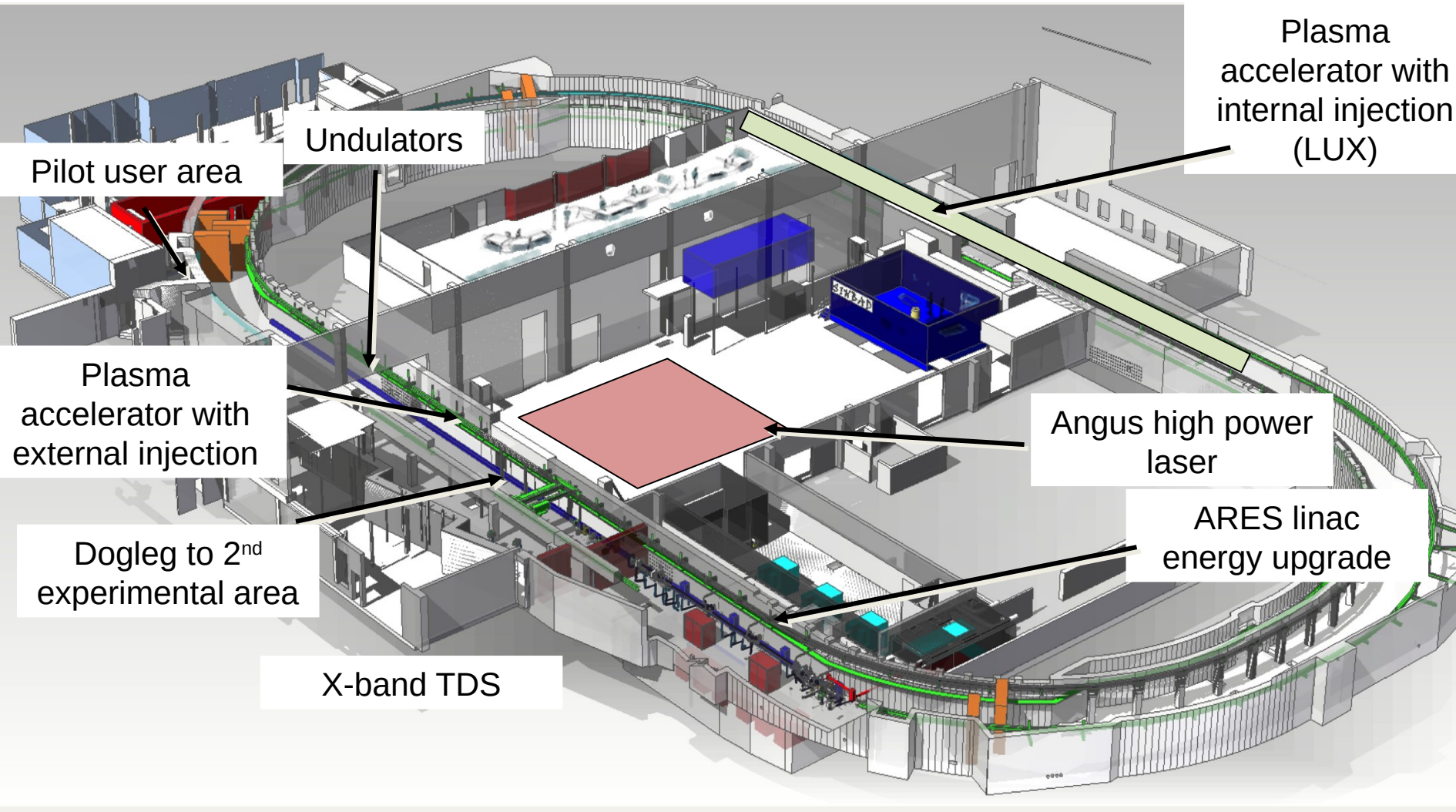


2+ Plasma targets



Internal injection by A. Maier

Summary future upgrades



+ space left in blue area for other ideas

Acknowledgements

- Various DESY groups
- University Hamburg
- The AXSIS collaboration partners
- ACHIP collaboration
- ATHENA partners
- ARIES
- The PolariX X-band collaboration
- ...

