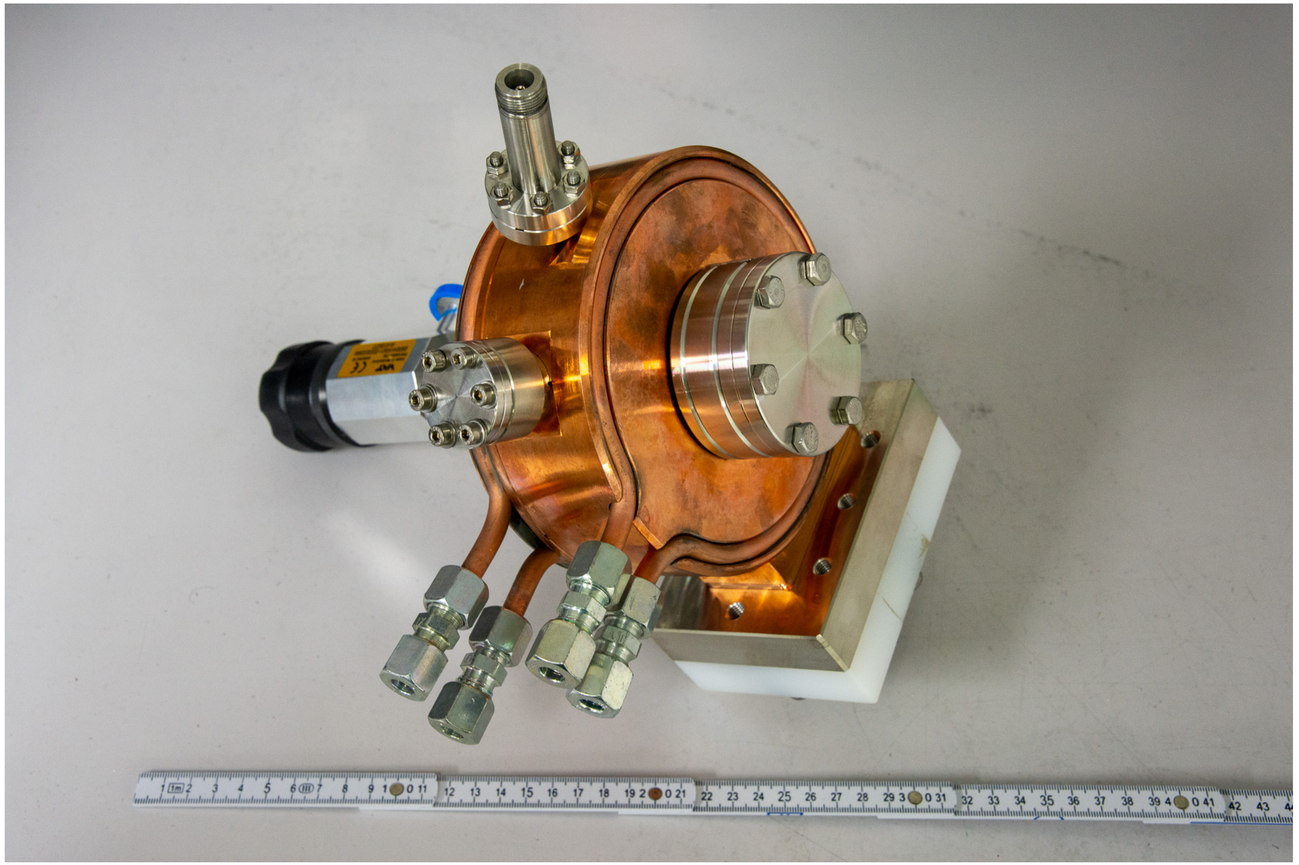
OPPORTUNITIES

- Measurement of electron beam emittance and energy spread
- Test of electron beam instrumentation
  - Wall current monitor
  - Wire scanners
  - THz structures
- Injector for FLASH therapy tests
- (Time-resolved) electron diffraction
- Test detectors for electron microscopy
- Single event upset tests, advanced temporal diagnostics, plasma acceleration, …
- Training of students

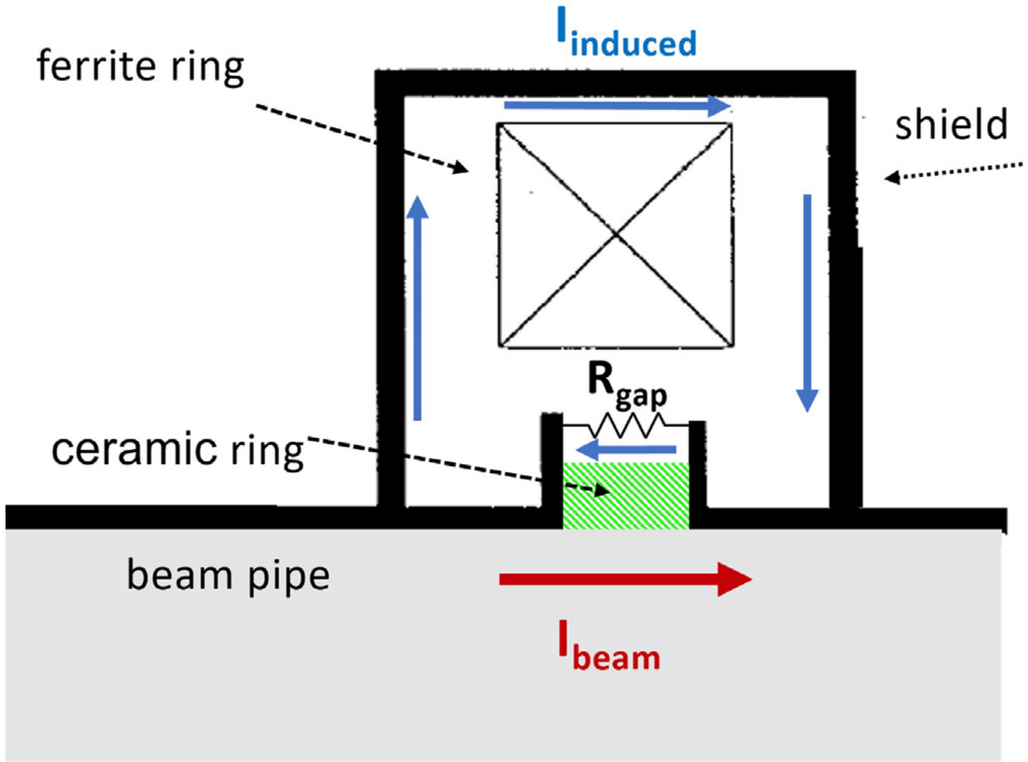
MEASUREMENT OF EMITTANCE AND ENERGY SPREAD

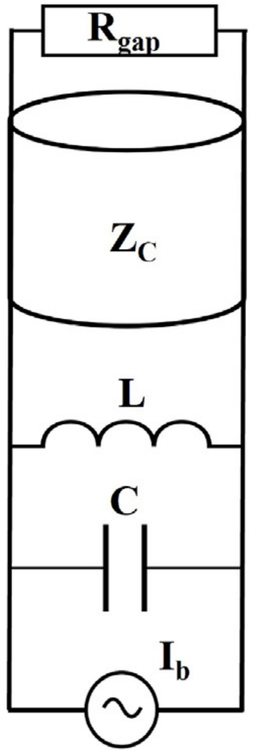
- Requires time-resolved imaging of the beam
- To be looked into: energy spread induced by the RF deflector



WALL CURRENT MONITOR

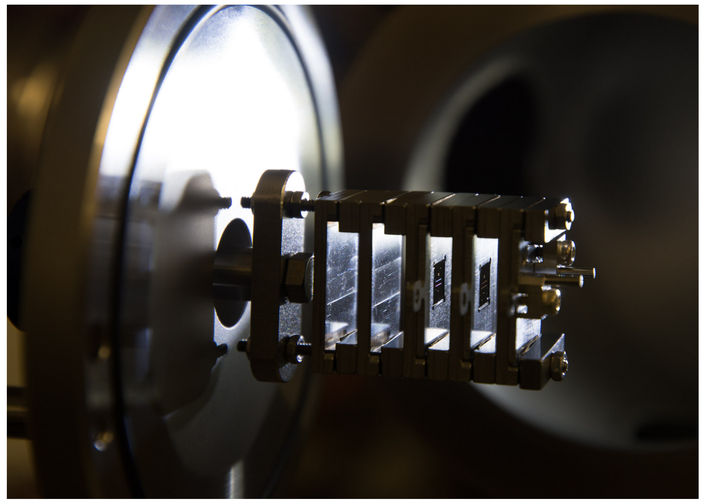
- Fast monitor for measuring bunch charge
- Expected to replace the Turbo-ICTs in SwissFEL

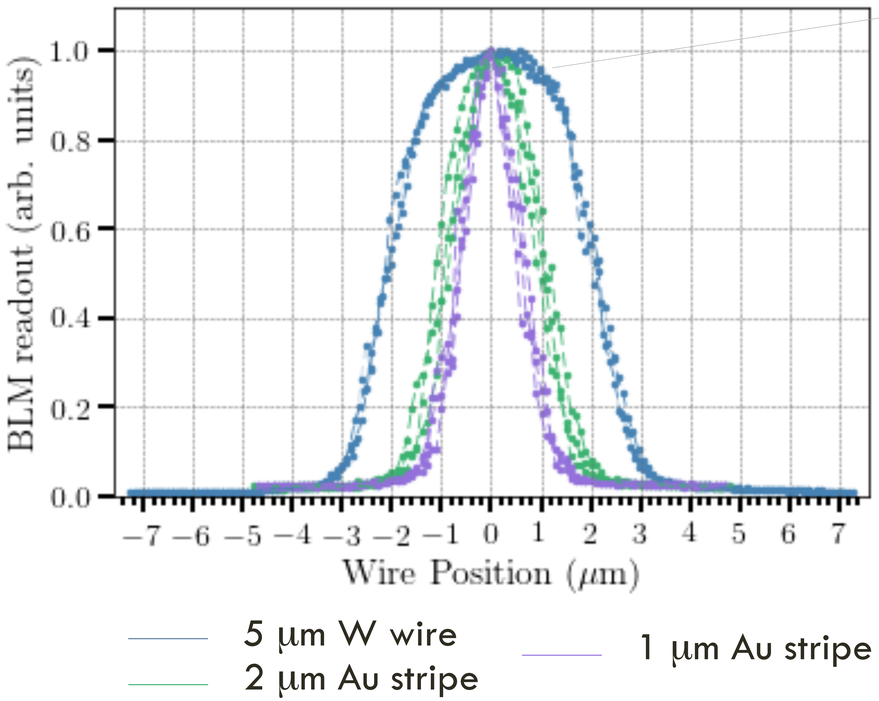




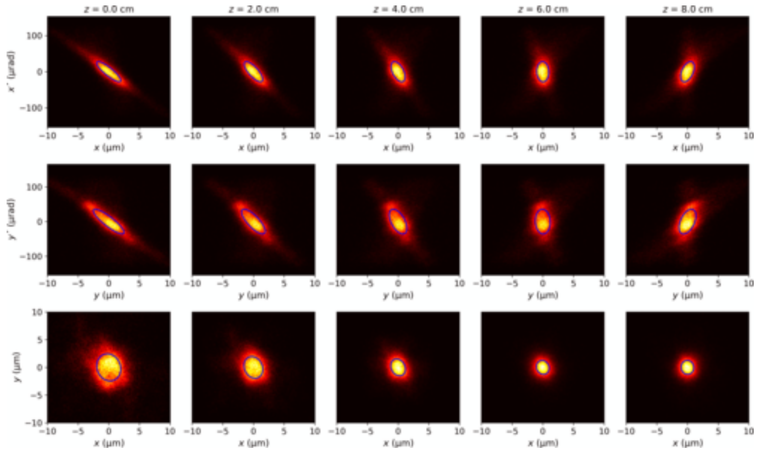
WIRE SCANNERS

- Micrometer wire scanners: measurements performed in SwissFEL





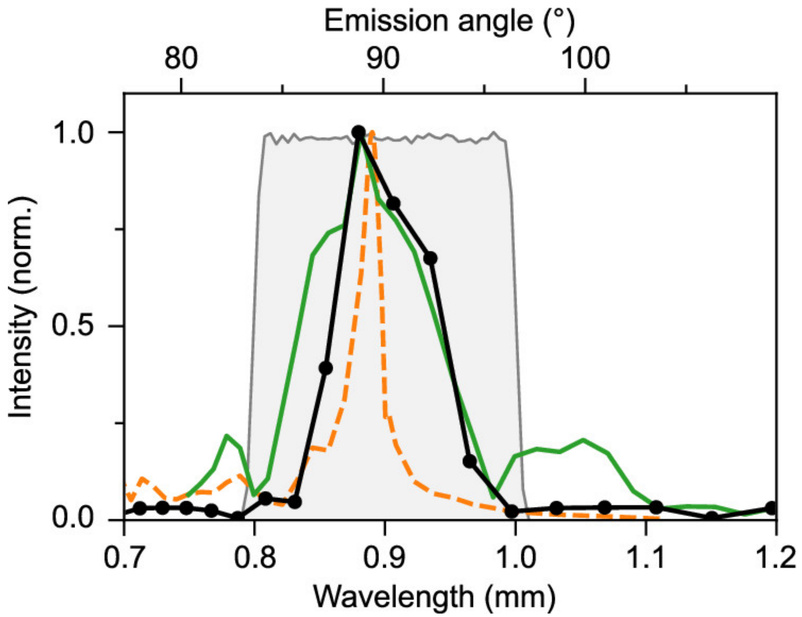
Wire	Resolution (μm)
5 μm W	1.25
2 μm Au	0.58
1 μm Au	0.29

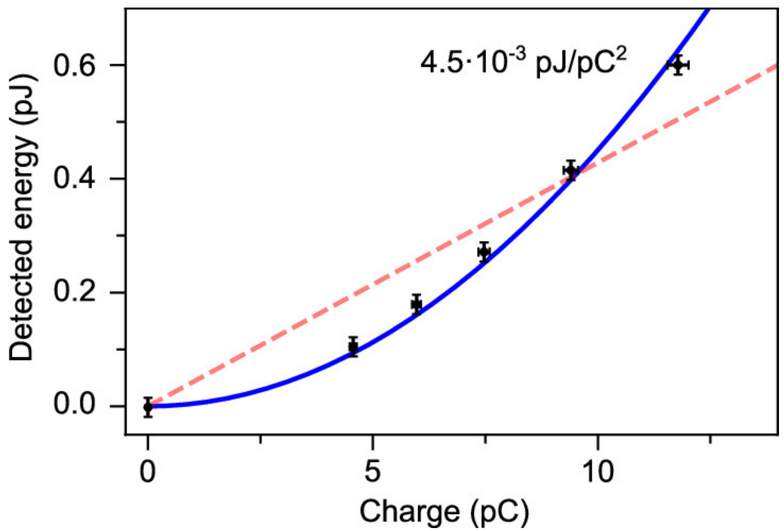


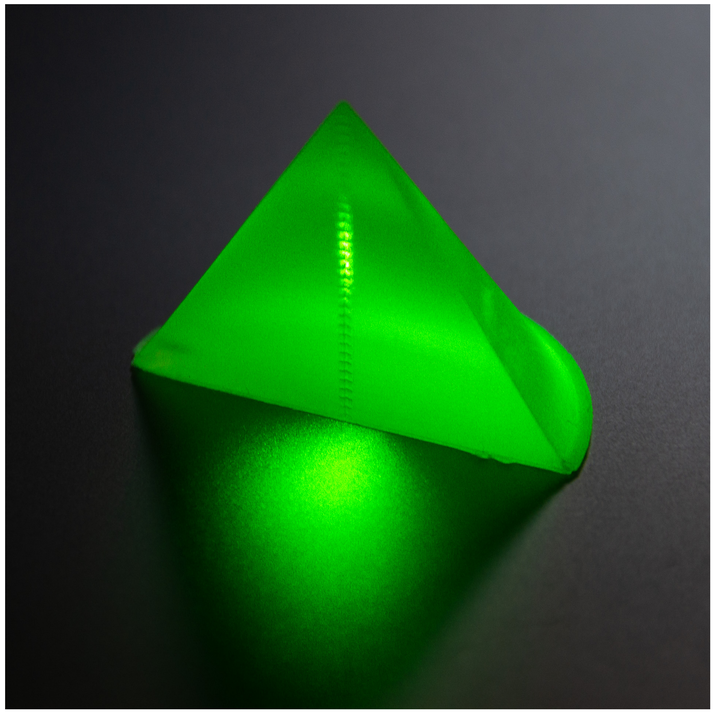
- PostDoc will join PSI in September

THz STRUCTURES

- Measurements performed in SwissFEL



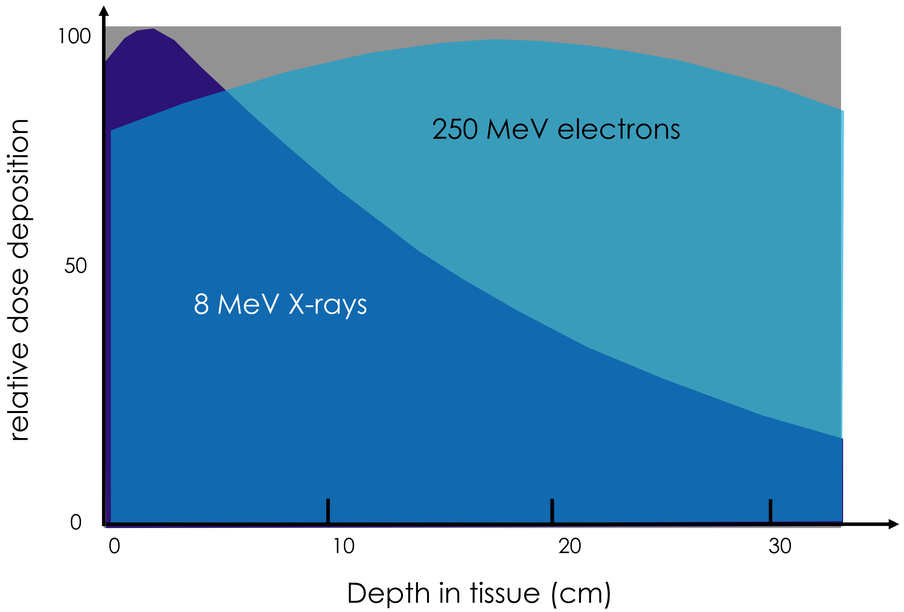




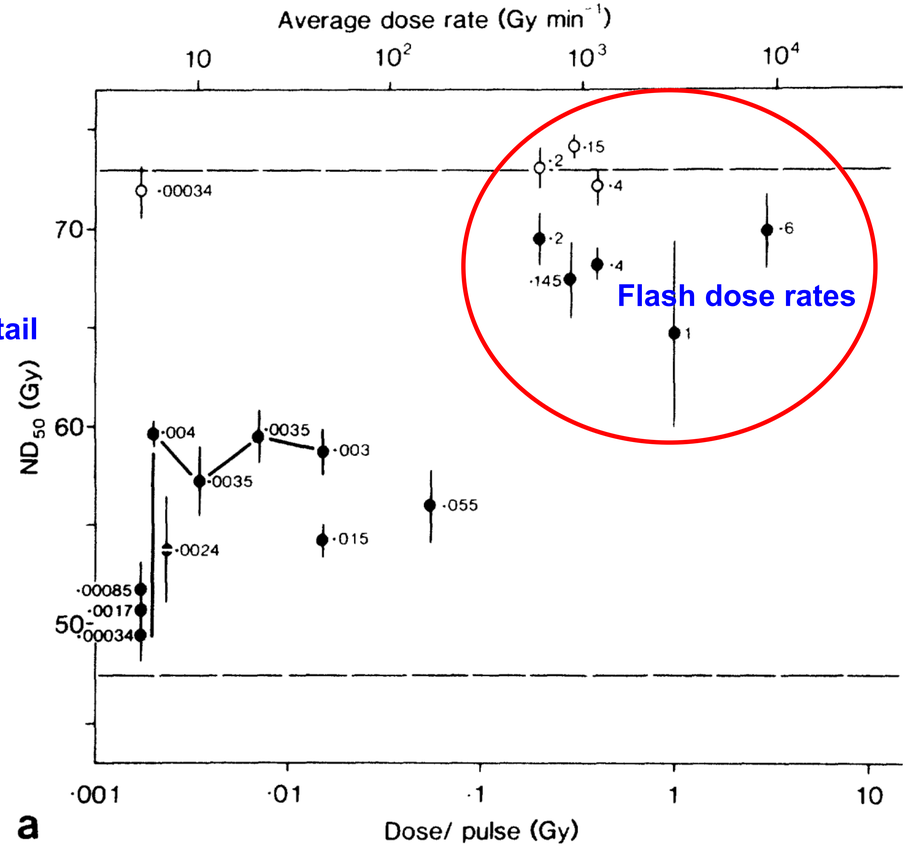
- PostDoc will join PSI in August

INJECTOR FOR FLASH THERAPY

- Observed when using X-rays in 1982
- Re-discovered for clinical applications in 2014
- Tests with protons have been performed at ProScan
- Possible tests in WLHA: FLASH with high-energy electrons



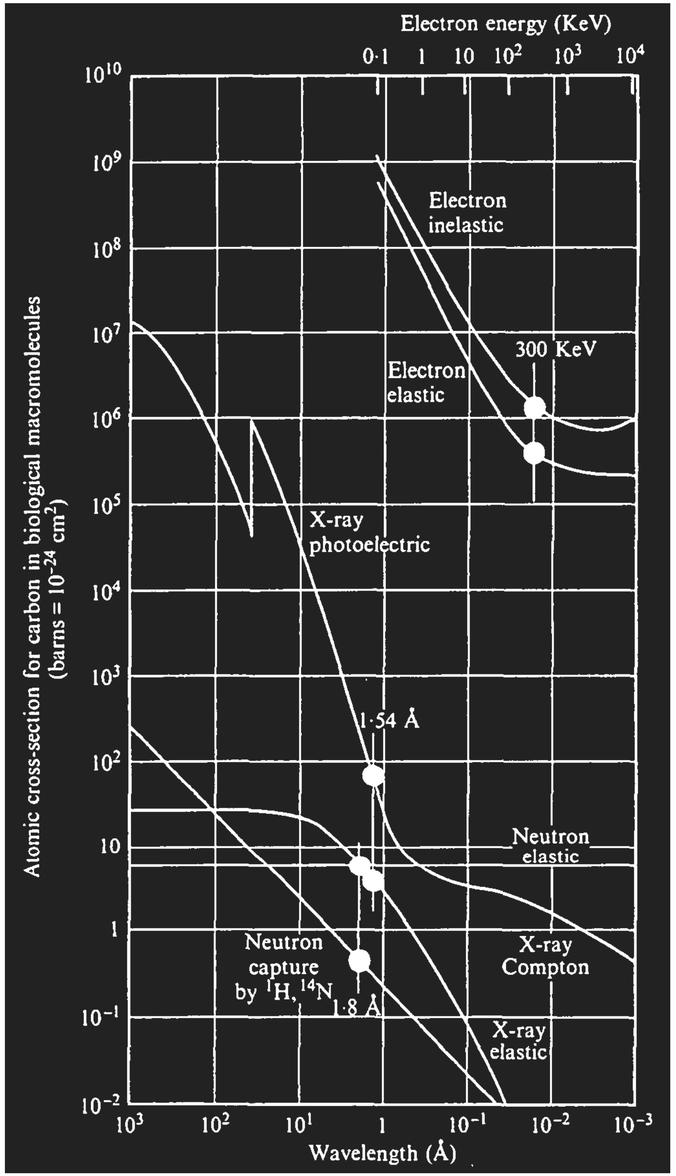
Dose for inducing tail necrosis in mice



Hendry et al., Radiation Research 92, 1, p. 172 (1982)

ELECTRON DIFFRACTION

- Cross section for electrons is orders of magnitude larger than for X-rays
  - Need very thin samples
- Minimum cross section around a few MeV



Henderson, Q Rev Biophys 28, 171 (1995)

TEST OF ELECTRON DETECTORS

- Tests of electron detectors performed in Daresbury Laboratory
- Such tests could also be performed at the WLHA test stand