Status of the FLUTE RF system upgrade

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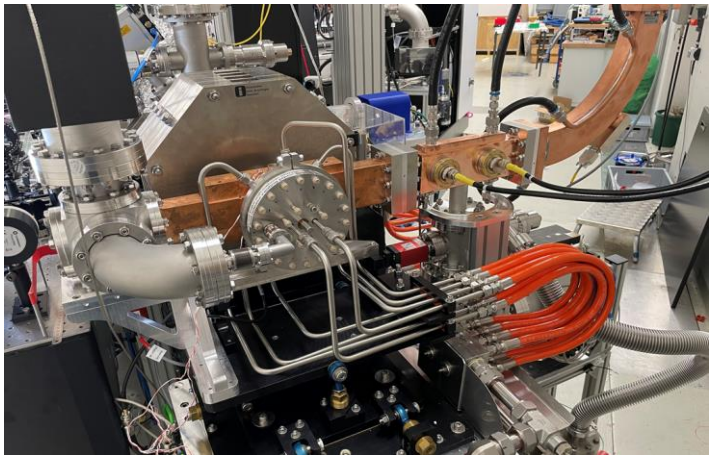
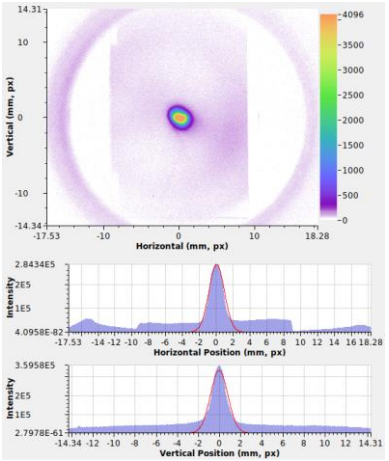
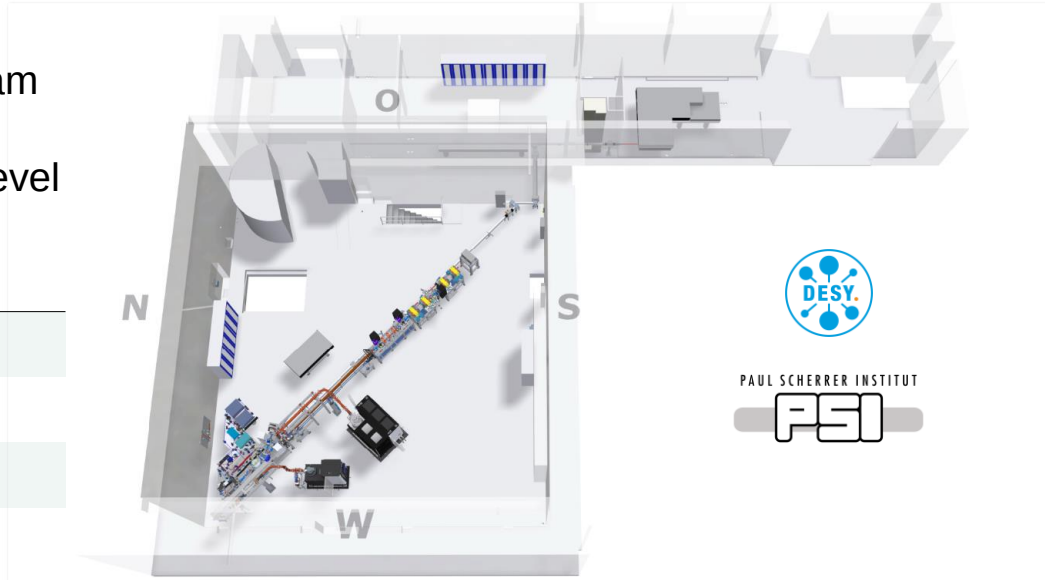




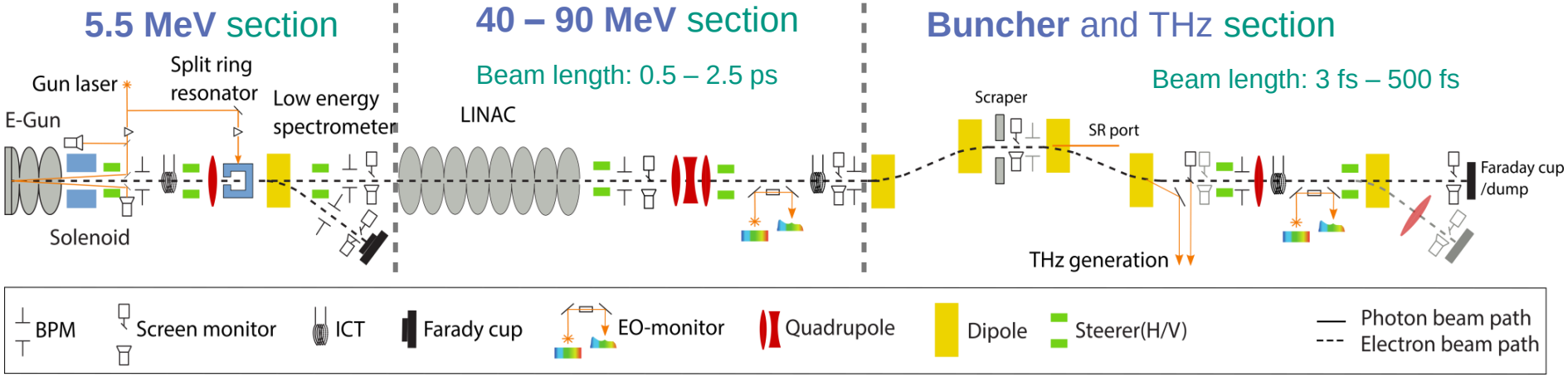
FLUTE: Accelerator test facility at KIT

- FLUTE (Ferninfrarot Linac- Und Test-Experiment)
  - Linac-based test facility for accelerator physics
  - Injector for a Very Large Acceptance compact Storage Ring (VLA-cSR)
- Main R&D topics
  - Serve as a test bench for new beam diagnostic methods and tools
  - Synchronization at femtosecond level
  - Systematic bunch compression and THz generation studies

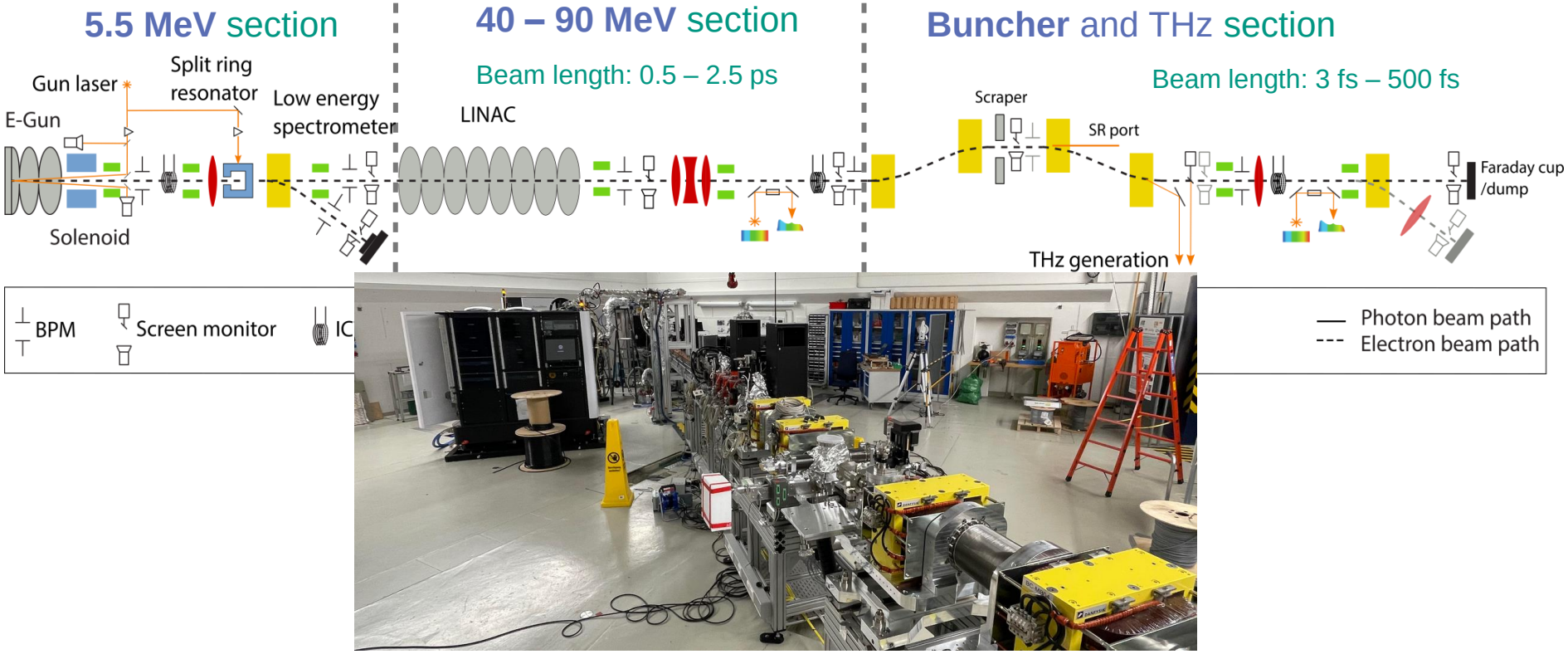
Final electron energy	50 – 90	MeV
Electron bunch charge	0.001 - 1	nC
Electron bunch length	1 - 300	fs
Pulse repetition rate	50	Hz



FLUTE: Layout



FLUTE: Layout

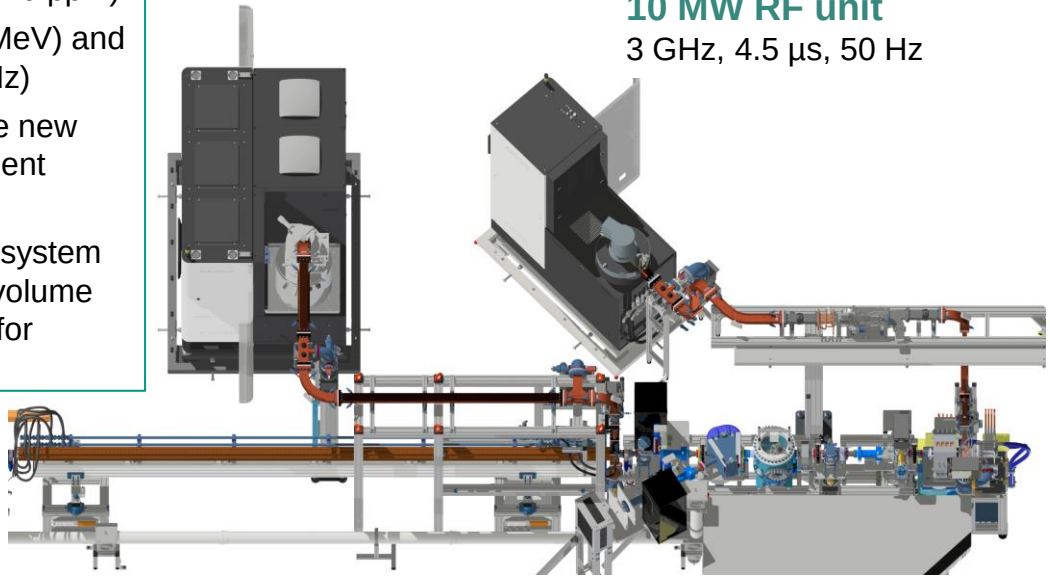


FLUTE: New RF system

- **Main advantages of the new RF system**
  - Higher RF stability (up to 20 ppm)
  - Higher energy (up to 90 MeV) and repetition rate (up to 50 Hz)
  - Precise positioning for the new RF photo-injector (alignment stand)
  - Fully vacuum waveguide system for the linac and smaller volume which requires SF6 gas (for circulator)

37 MW RF unit
3 GHz, 4.5 µs, 50 Hz

10 MW RF unit
3 GHz, 4.5 µs, 50 Hz



RF photo-injector
q = 1 pC – 1 nC
E = 5.5 MeV
t = 0.5 – 2.5 ps
50 Hz