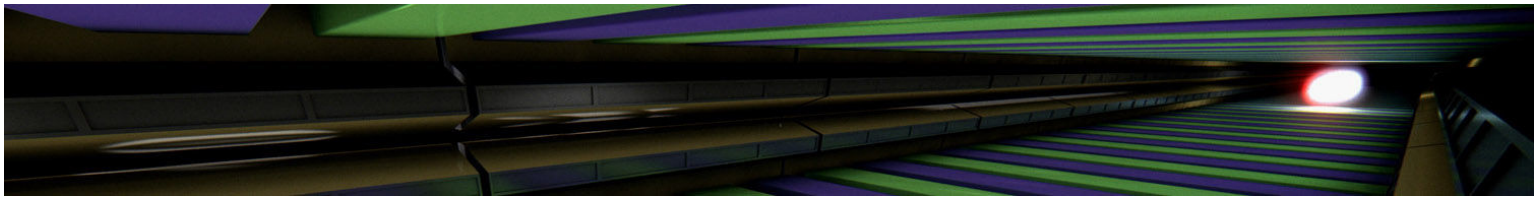
European XFEL



Third Harmonic RF Systems

developments for the XFEL and for FLASH as prototype

INFN

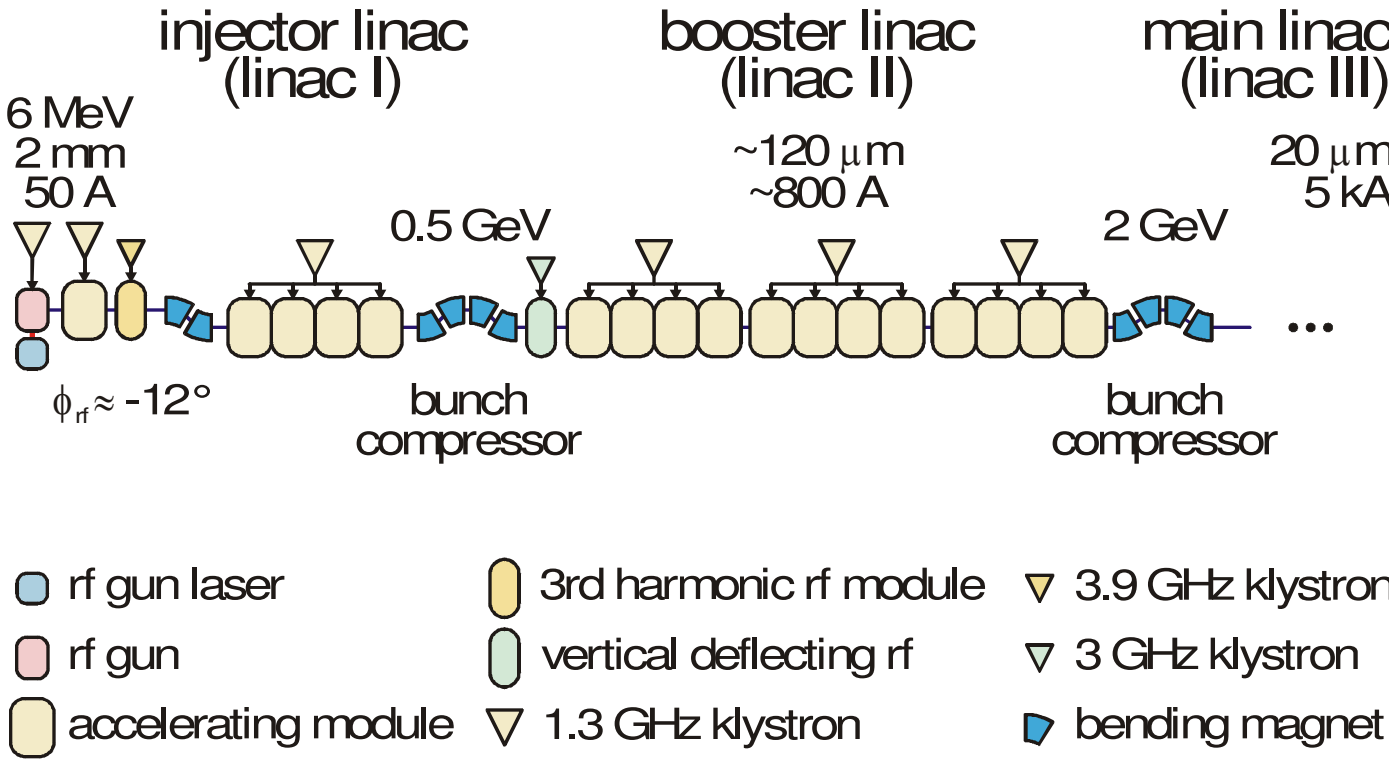
Fermilab

DESY

European XFEL

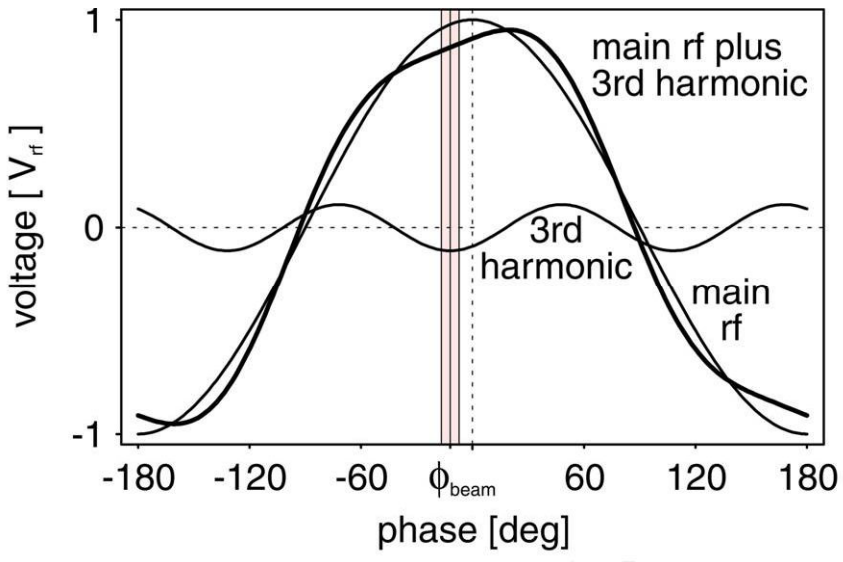
Bunch forming

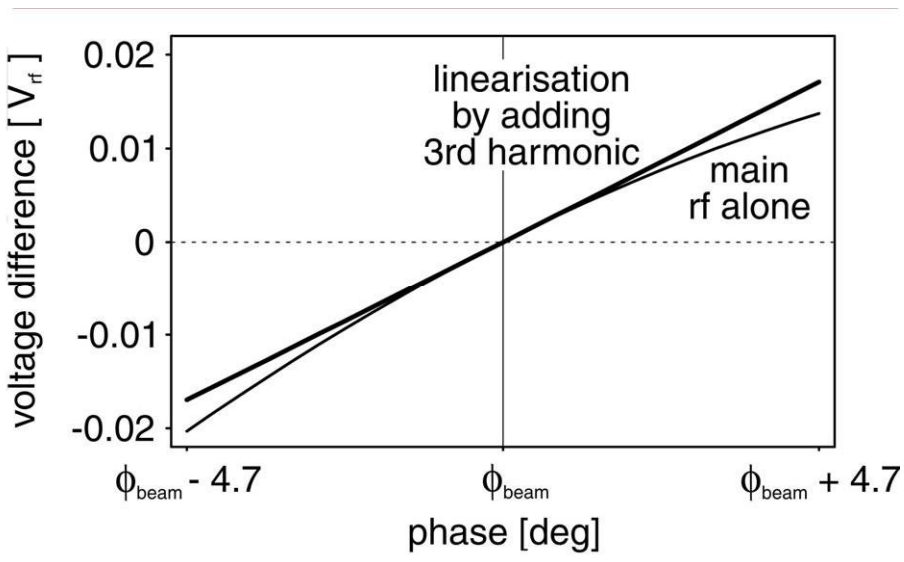
- two stage bunch compression at the XFEL



European XFEL

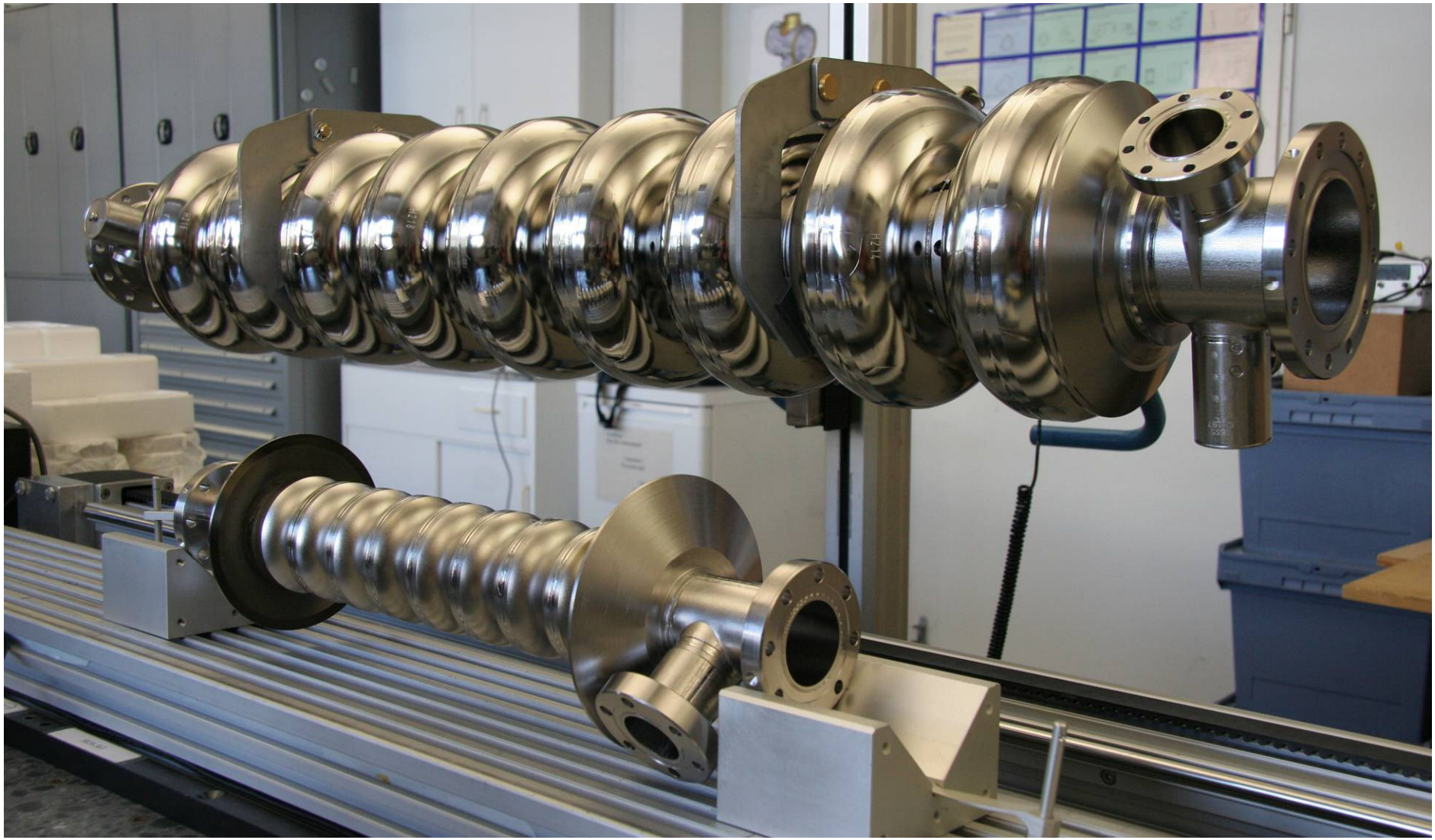
Phase space linearization



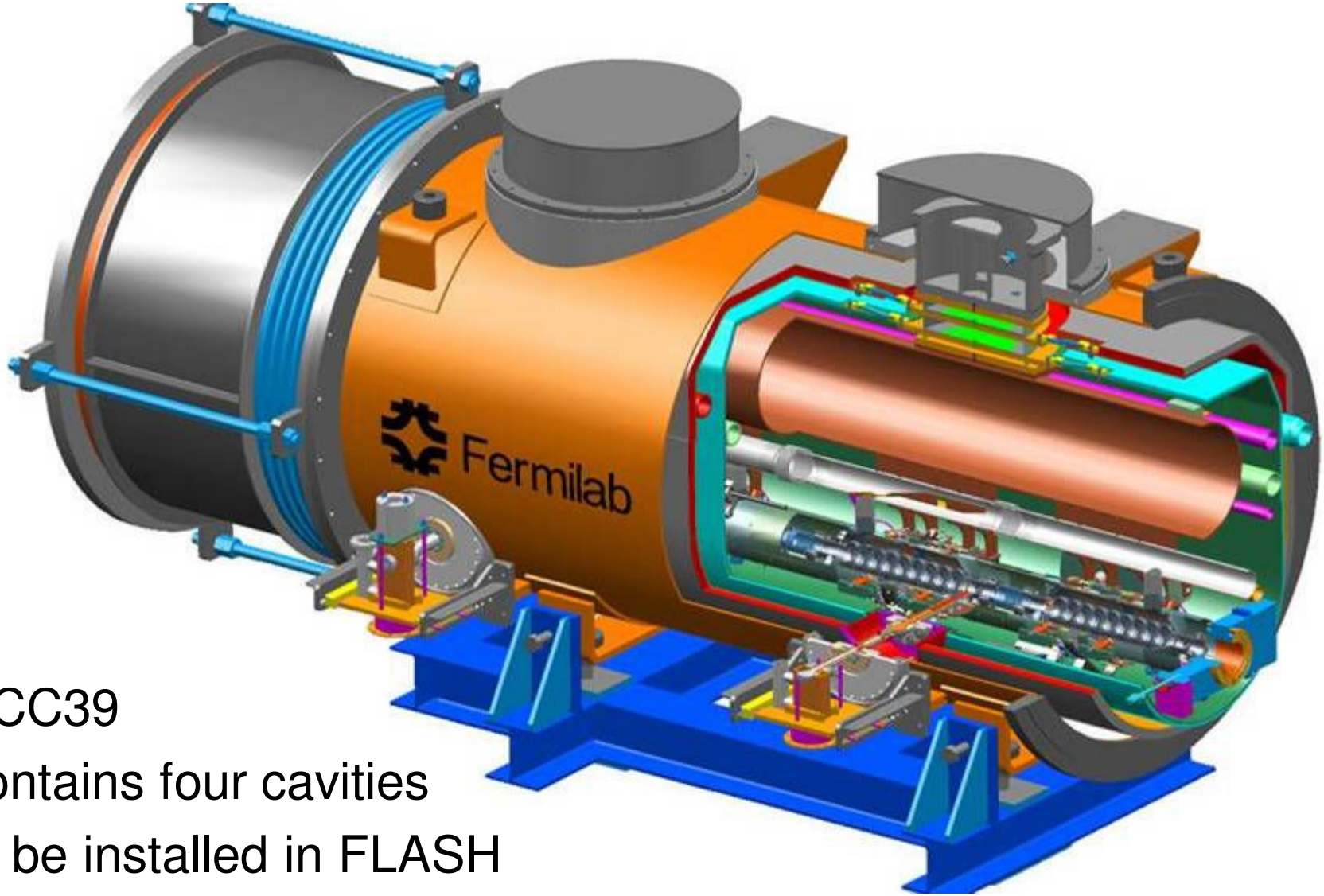


- Additional effects: space charge, longitudinal wake fields, ...
- **Sum voltage** required: **40 MV**
- Using nine-cell superconducting cavities

3.9 GHz cavities are ‘downscaled’ from 1.3 GHz



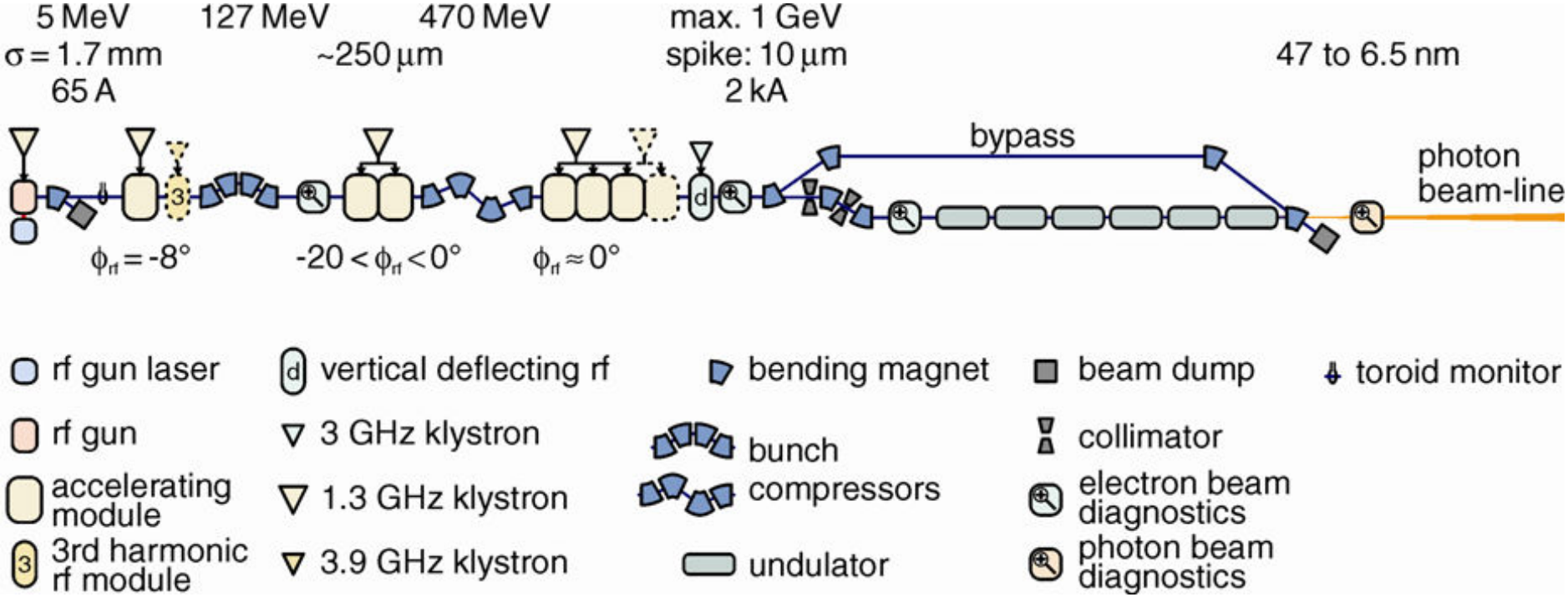
FNAL build 3.9 GHz module as archetype



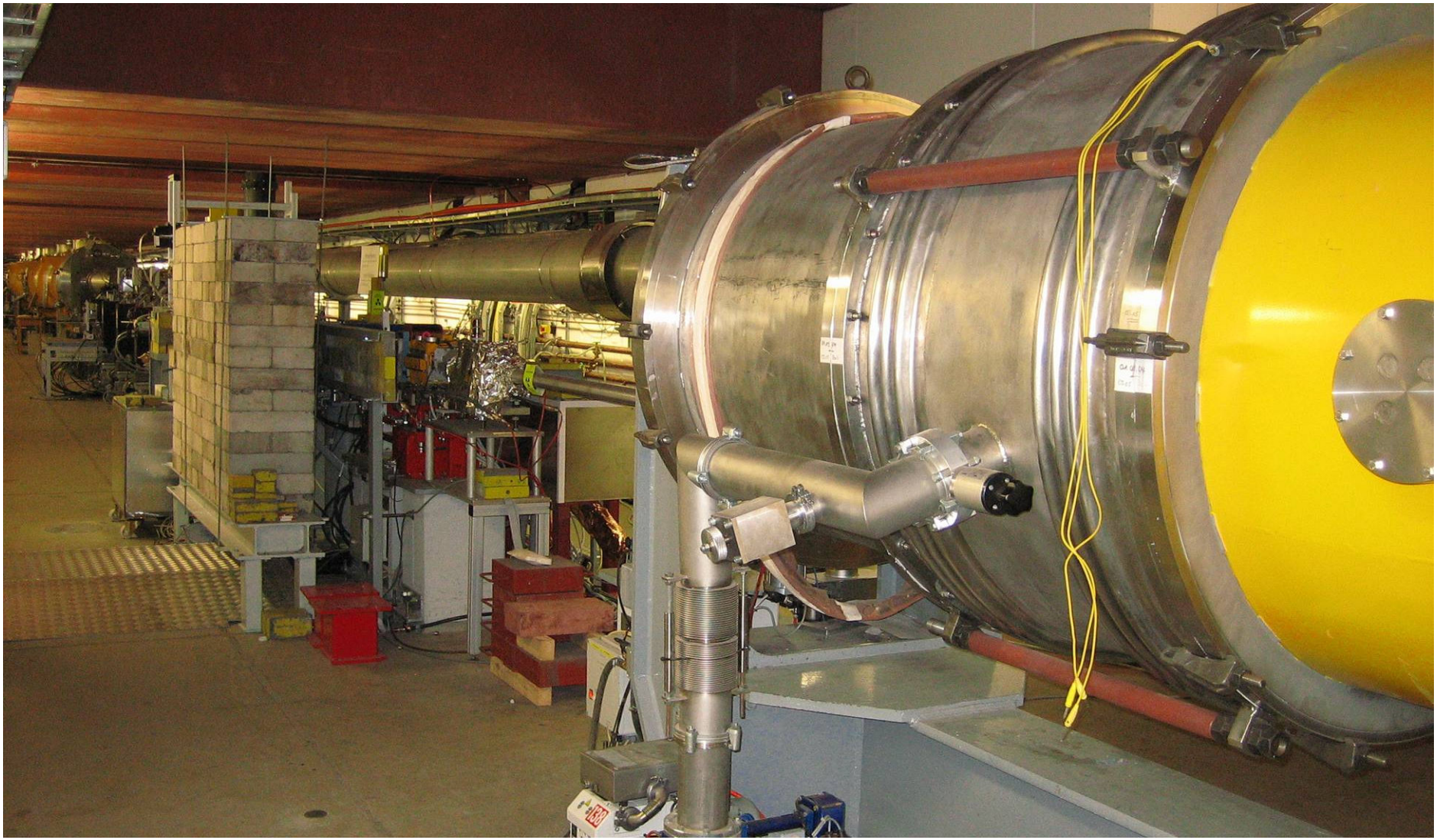
- ACC39
- contains four cavities
- to be installed in FLASH

European XFEL

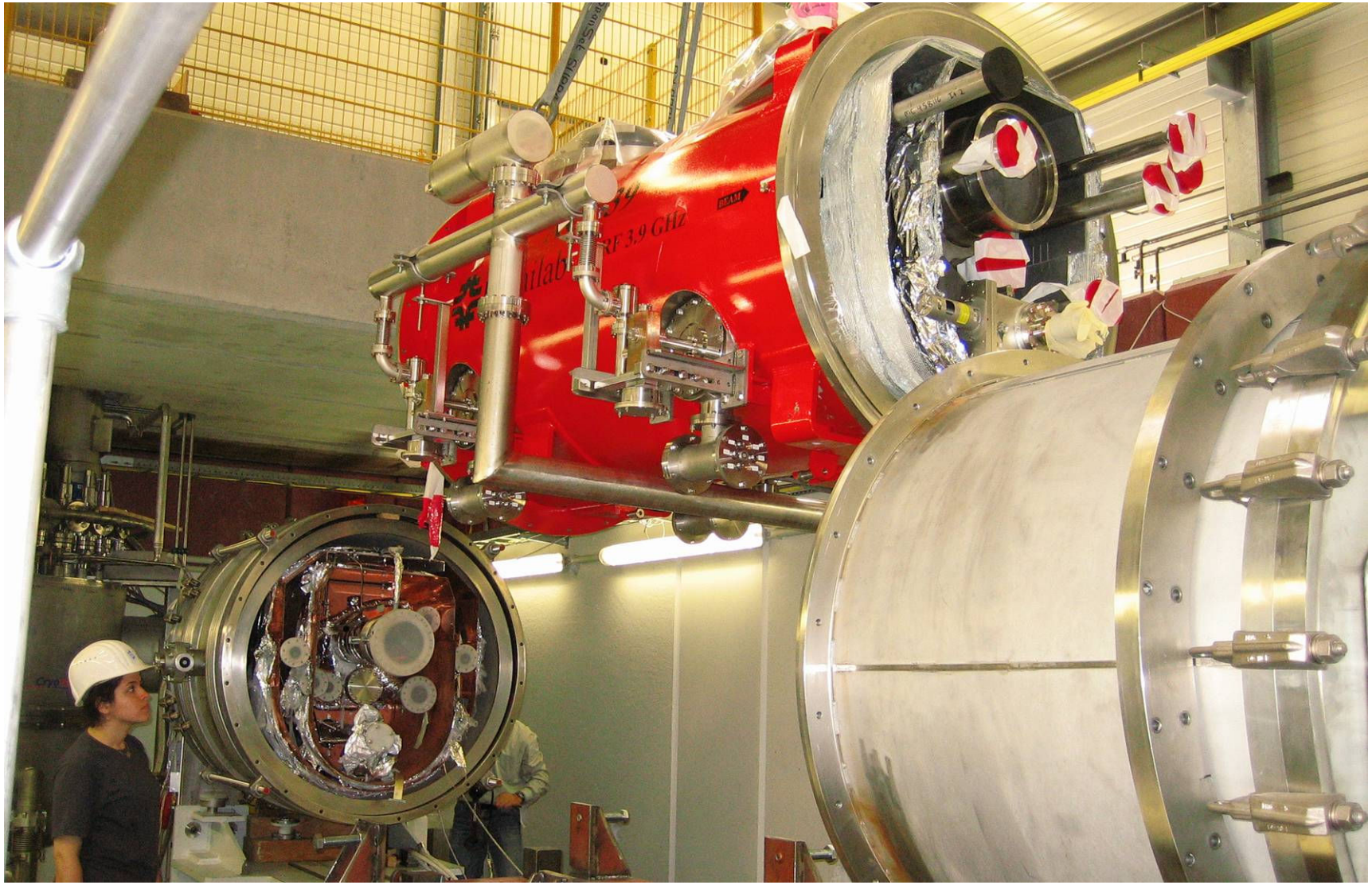
Later position of ACC39 in FLASH



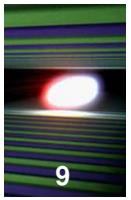
In the FLASH tunnel



ACC39 will first be tested at the CMTB

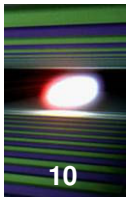


Design differences FLASH and XFEL



- sum voltage **40 MV** instead of **~ 19 MV**
- **8 cavities** instead of **4**
- XFEL module with **quadrupole** and **BPB**
- several **cavity design changes** due to the **production** by European industry

Proposed work distribution INFN and DESY



- **INFN** develops and builds the
  cavities and
  the **module**

- **DESY** develops and provides the **surrounding systems**
  like power RF,
  RF control and
  lager infrastructure like
  the horizontal cavity test capability,
  the clean room for string assembly,
  and so on