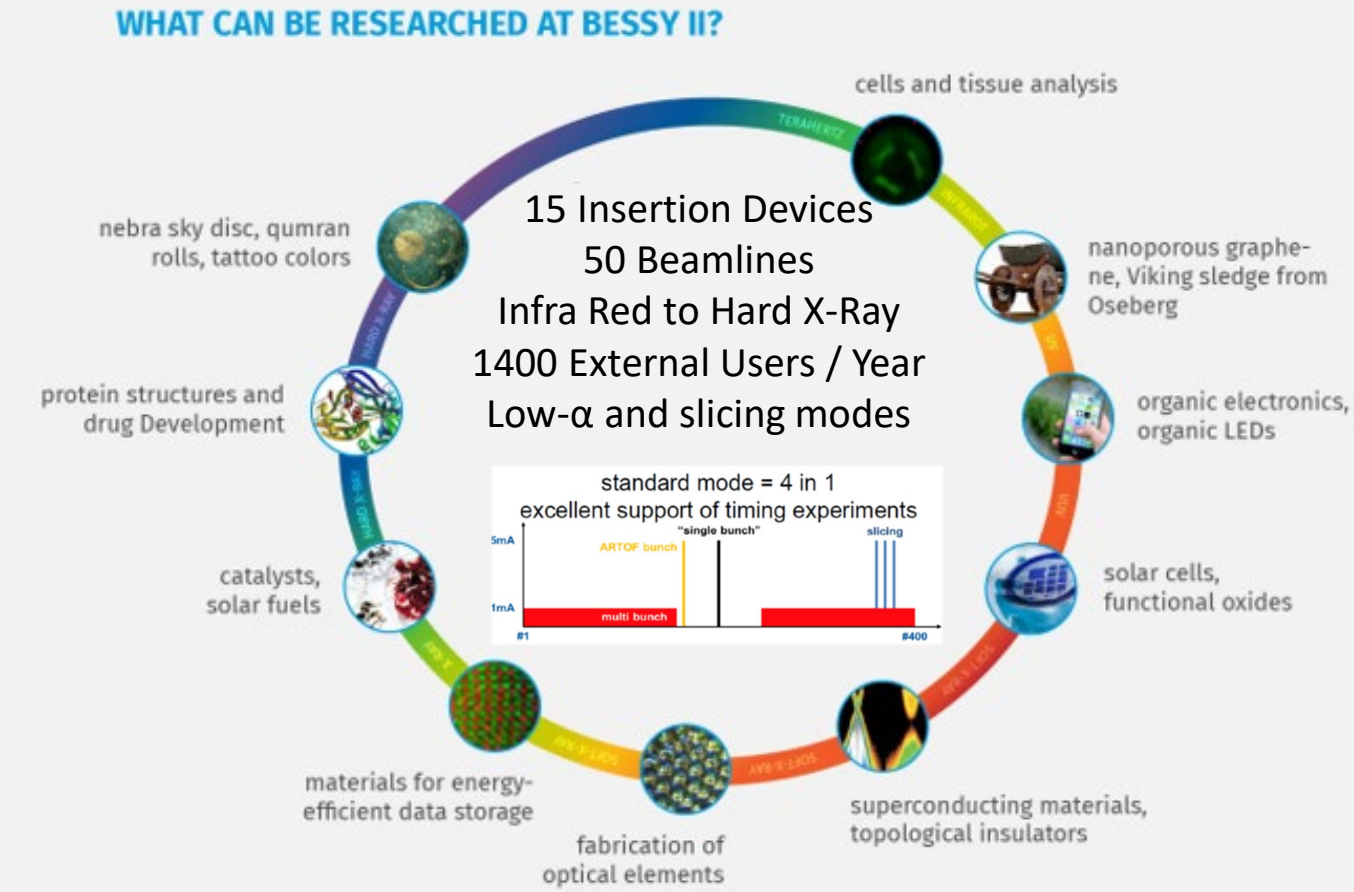
Helmholtz Zentrum Berlin: BESSY II

HZB BESSY II Light Source

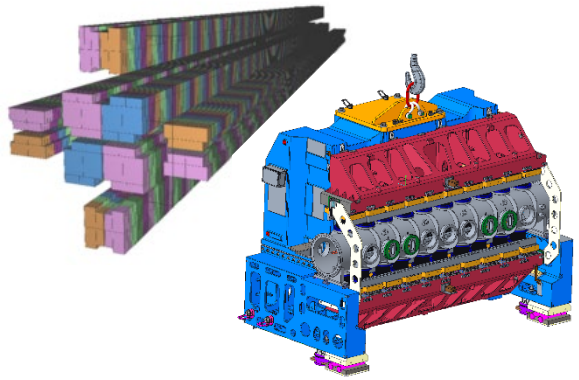
3rd Generation 1.7GeV Synchrotron Light Source located in Berlin, Germany since 1998

Research at HZB BESSY II



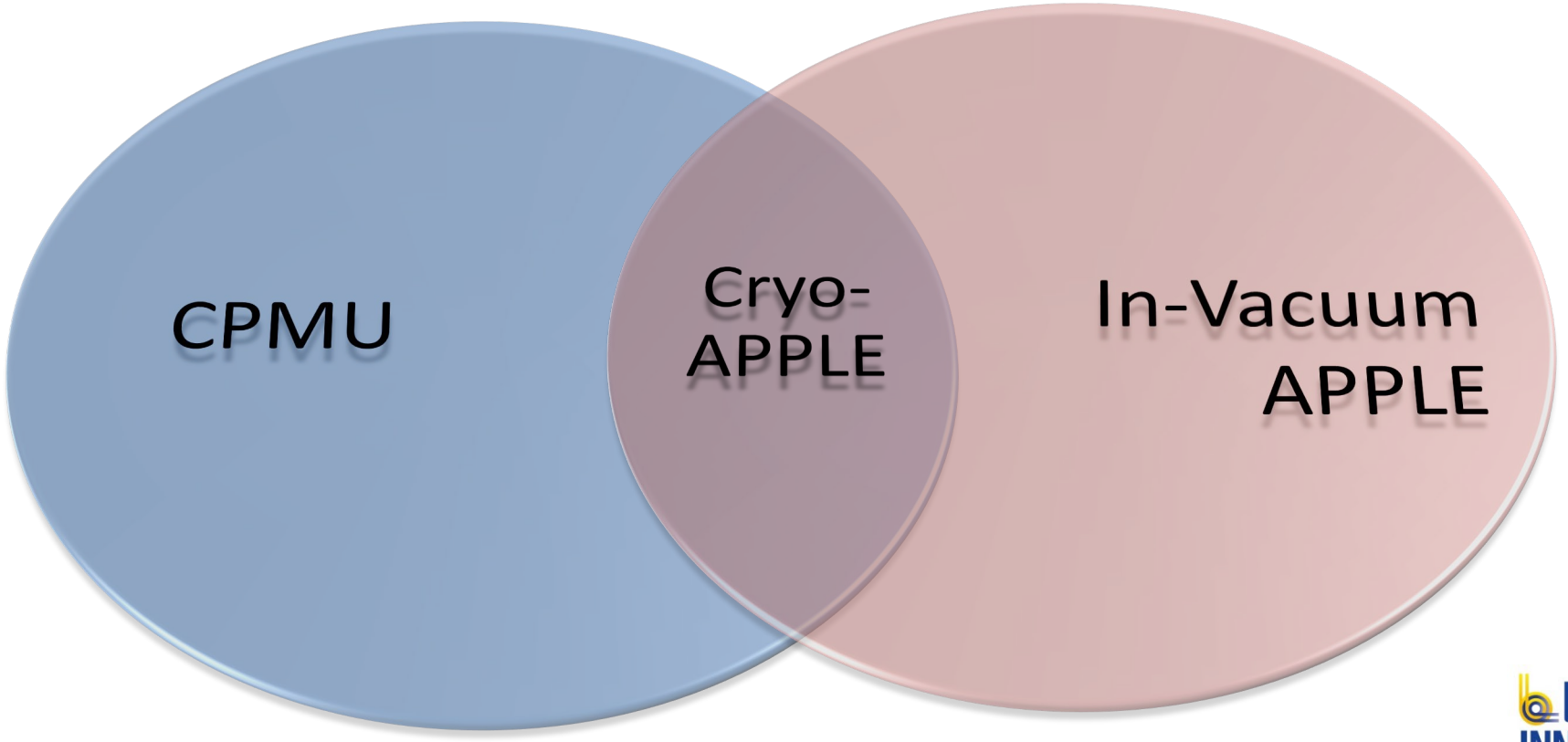
Undulators @ HZB

- 25 years of in-house development
  - World class magnet measurement lab
  - >15 undulators built
- R&D
  - In-vacuum APPLE II
  - Cryogenic APPLE
  - Measurement systems



Cryogenic APPLE – a unique photon source

High Field → Short Period → Flexible Polarisation



Conflicting requirements

- A rigid structure
  - that allows for thermal contraction
- Small components
  - that must control large forces
- A UHV environment
  - that allows liquid nitrogen and sensor feedthroughs
- Small allowable deflections
  - where support points are far from point of action of large forces
- A thermally isolated cold mass
  - rigidly supported to external structures

Progress

- Magnetic force compensation scheme
- Small magnetic period length
  - 15mm period, 6 magnets per period
  - Worked with Vacuumschmelze to magnetise pre-bonded half-period magnet packets
- UHV compatible magnet bonding
  - developed in collaboration with Vacuumschmelze
- In house mechanical design started
- Significant remaining challenges
  - high precision machining of complex components
  - Magnetic measurements
  - Precision gap and shift measurement