

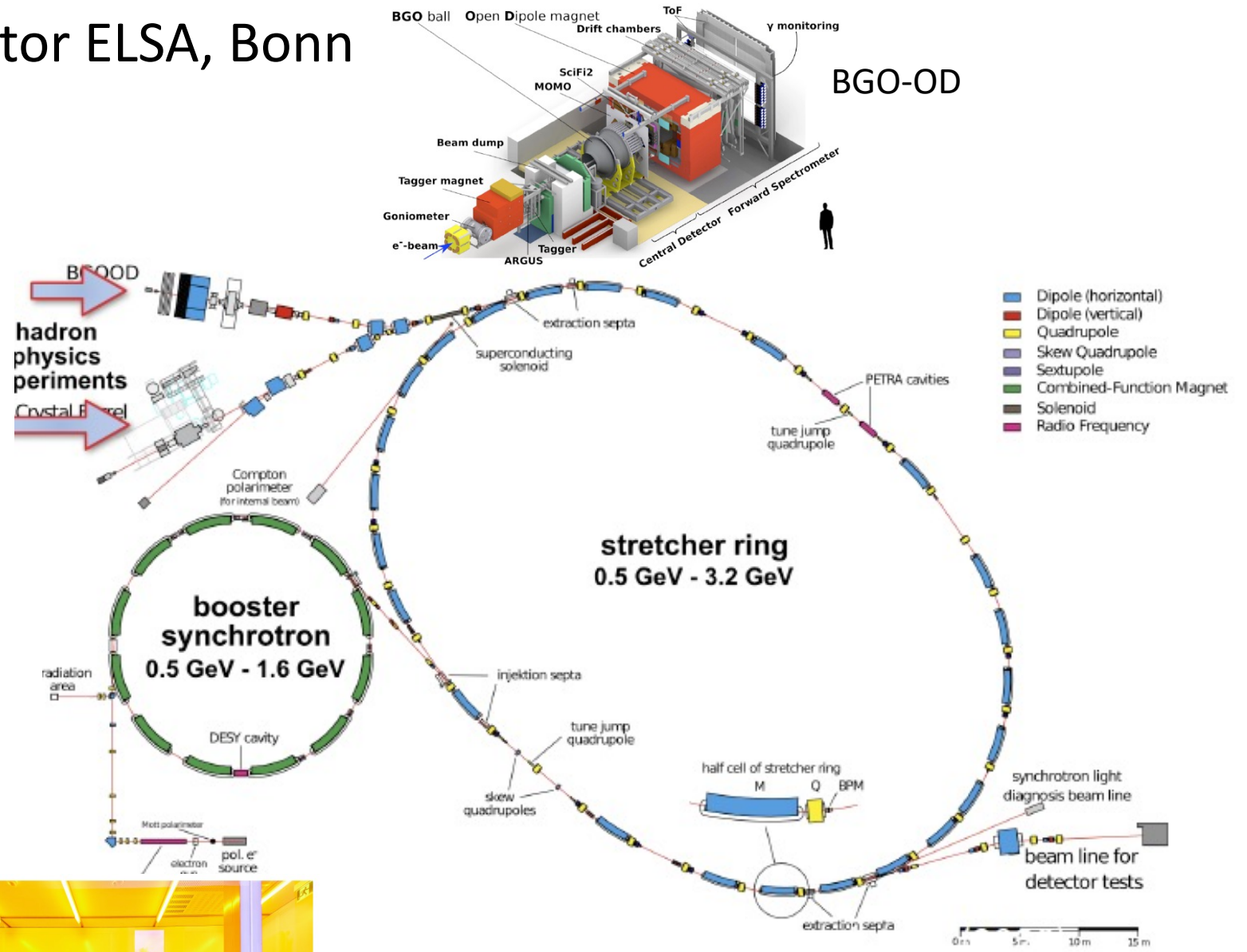
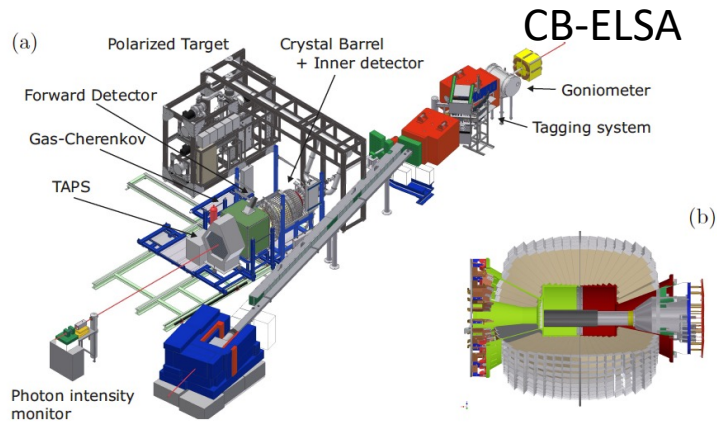
ELSA electron accelerator
Cyclotron Bonn
Research and Technology center FTD

Helmholtz-Institut für Strahlen- und Kernphysik
Physikalisches Institut,

University of Bonn, Germany

Frank Maas, HI Mainz, 3rd meeting of the NUPECC LRP 2024 topical working group 6, online

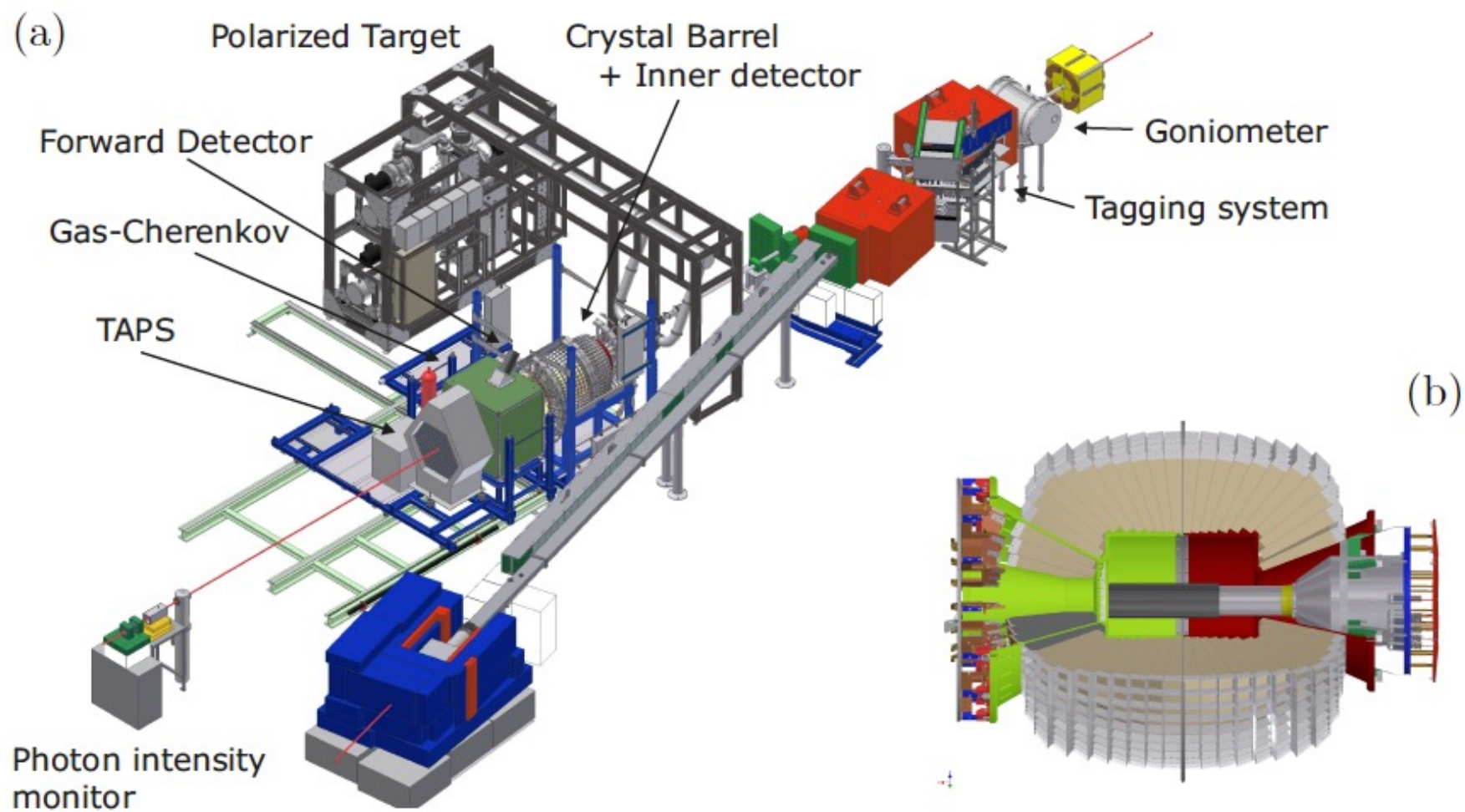
3.2 GeV electron accelerator ELSA, Bonn



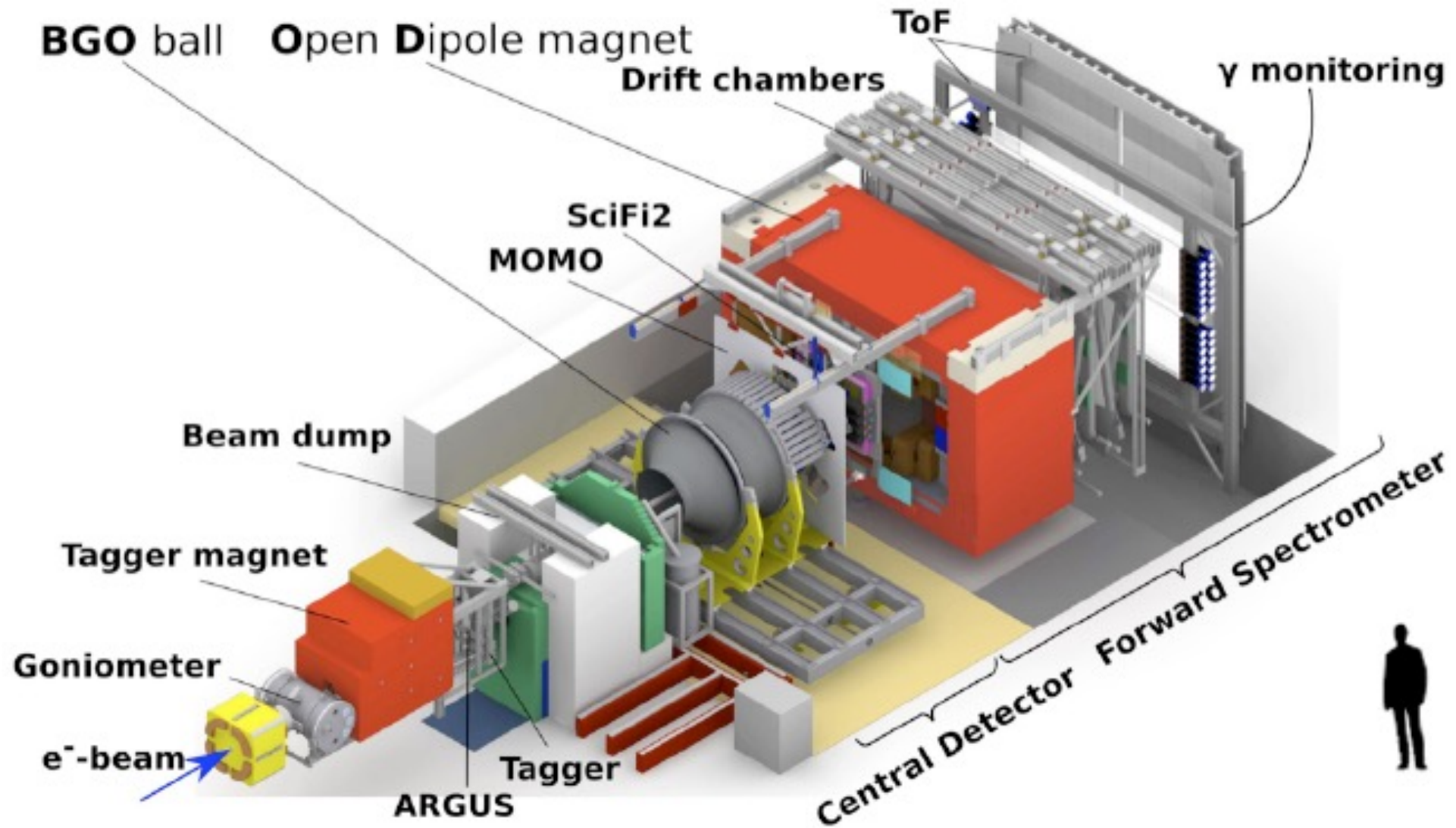
2 Hadron Physics Experiments
BGOOD
Crystal Ball
Electron beam converted to a high energy photon beam
Research and Technology Infrastructure for Detector Physics



CB-ELSA



BGO-OD



Research and Technology center FTD, Bonn , Germany



ELSA and FTD, Bonn, Germany

- Host Laboratory:
Institute for Physics,
Rheinische Friedrich-Wilhelms-Universität Bonn
(operated by a university)
- Beam time distributed on the basis of PAC
recommendations of beam time letter-of-intents and
proposals
- “Elektron Stretcher Anlage” ELSA :
- Three stage electron accelerator
 - Injector
 - Booster synchrotron (0,5 GeV - 1,6 GeV)
 - Stretcher ring (0,5 GeV - 3,2 GeV)
 - Slow extraction electron beam from stretcher
 - Stored beam current: A
 - Extracted beam current: nA
- Instruments at ELSA (1):
 - High resolution hermetic calorimeter Crystal Barrel
CB-ELSA
 - Photon tagging facility
 - Hermetic crystal calorimeter
 - Frozen Spin target
 - Optimized for the detection of neutral particles
 - Just finished major upgrade
 - Major upgrade for detection of charged particles is
planned
 - High resolution calorimeter with open dipole BGO-OD
 - Photon tagging facility
 - Crystal calorimeter in combination with open dipole
magnet
 - Optimized for the detection of (neutral and) charged
particles
 - Just finished major upgrade

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- Instruments at ELSA (2), upgrades:
 - Beam dump experiment LOHENGRIN
 - Major upgrade
 - Planned experiment
 - Elastic electron scattering for proton radius study
 - Test beam area for detector tests
 - Large energy range (0.5 GeV – 3.2 GeV) of electron
beam
 - Low electron current sufficient

ELSA and FTD Bonn, Germany

- Research and Technology Center for Detector Physics (FTD)
 - Development and exploration of novel detector technologies for fundamental physics
 - unique possibilities for the fabrication of novel micro-structured sensors
 - development of highly integrated circuits, as well the characterization of sensors
 - fundamental physics, medical imaging and dosimetry in radiation therapy, investigation of radiation damage in electronic devices and living tissue to astrophysical applications
 - Support for ALICE, AMBER, ATLAS, LHCb at CERN, Belle II at KEKB, Axion and Dark-Matter experiments, PANDA at FAIR and the local experiments
- Bonn Isochronous Cyclotron: proton, deuteron, alpha particle and other light ion beams with a charge-to-mass ratio Q/A of $\geq 1/2$ and kinetic energies ranging from 7 to 14 MeV
 - Irradiation of detectors
 - New installation with extended diagnostics