WP7: high brightness accelerators for light sources

- *Scope: WP7 pursues the R&D on new technical solutions for the design and construction of **accelerator-based light sources,** exceeding the performance of present machines. The research embraces both **storage ring based synchrotron light sources** and **free electron laser driven by Linacs.***

- *Fostering **networking activities** building on the previous EU networks funded within the ARIES and EuCARD2 projects*

  Tasks 7.2: enabling technologies for ultra-low emittance rings

- *Supporting **R&D and prototypes** on cutting edge technological aspects, critical in the construction of new, compact, and sustainable accelerators*

  Tasks 7.3: Longitudinal variable dipole for the ELETTRA upgrade (Y. Papaphilippou, CERN)

  Tasks 7.4: High gradient RF guns with C-band technology (D. Alesini, INFN Frascati)

  Tasks 7.5: X-band accelerating structure prototype (G. D'auria, ELETTRA, Trieste) – see next slides

Most deliverables in year 4 – no major issue to report

Task 7.2 Activties: workshops on magnet technology

Workshop on permanent magnet based magnets for ultra low emittance rings (Trieste, 14-15th November 2023)

Recent trends in the design, construction and operation of PM based magnets

Joint LEAPS/I-FAST workshop

https://indico.cells.es/event/1373/ (E. Karantzoulis, F. Perez)

Mini-workshop on resistive magnets for ultra low emittance rings (DESY 1st-2nd June)

Investigate challenges and recent trends in the design, construction and operation of resistive magnets for ultra low emittance rings

https://indico.desy.de/event/39184/ (M. Thede, R. Bartolini)

Task 7.2: summary of upcoming activities

Regular meetings: *scheduled for Task. 7.2 chaired by A. Mochihashi (KIT)*

Upcoming workshops:

- General workshop ultra low emittance rings

  12^{th}-16^{th} February, CERN

  one day dedicated to Sustainability, efficiency and power consumption

  https://indico.cern.ch/event/1326603/

- Workshop on Bunch-by-Bunch Feedback Systems and Related Beam Dynamics (KIT)

  4^{th}-5^{th} March 2024 (moved from November 23)

  https://indico.scc.kit.edu/event/3742

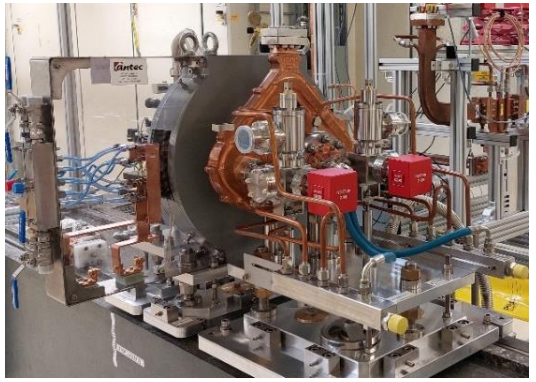
- Workshop on Injectors for Storage Ring Based Light Sources (KIT)

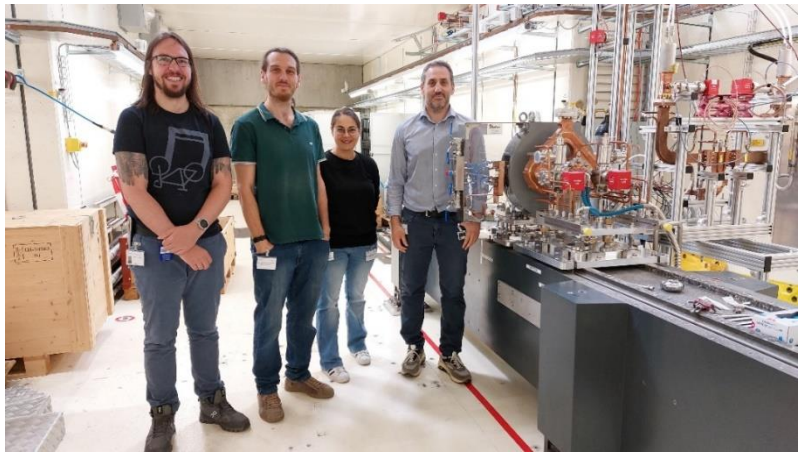
  6^{th}-7^{th} March 2024

  https://indico.scc.kit.edu/event/3948/

Task 7.4: very high gradient RF guns with C-band technology

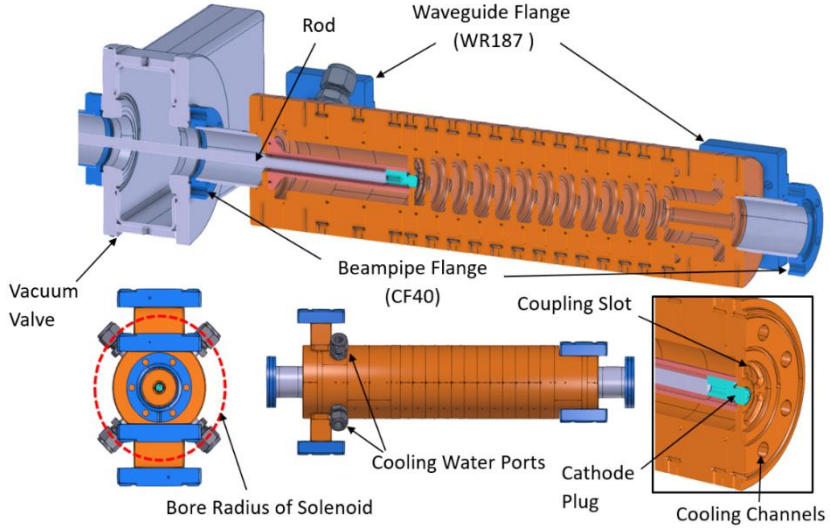
INFN Istituto Nazionale di Fisica Nucleare — SW GUN — COMEB





Standing Wave gun realized, assembled in the module and installed at PSI C-band test facility: ready to start the high power RF conditioning

PAUL SCHERRER INSTITUT PSI — TW GUN — VDL

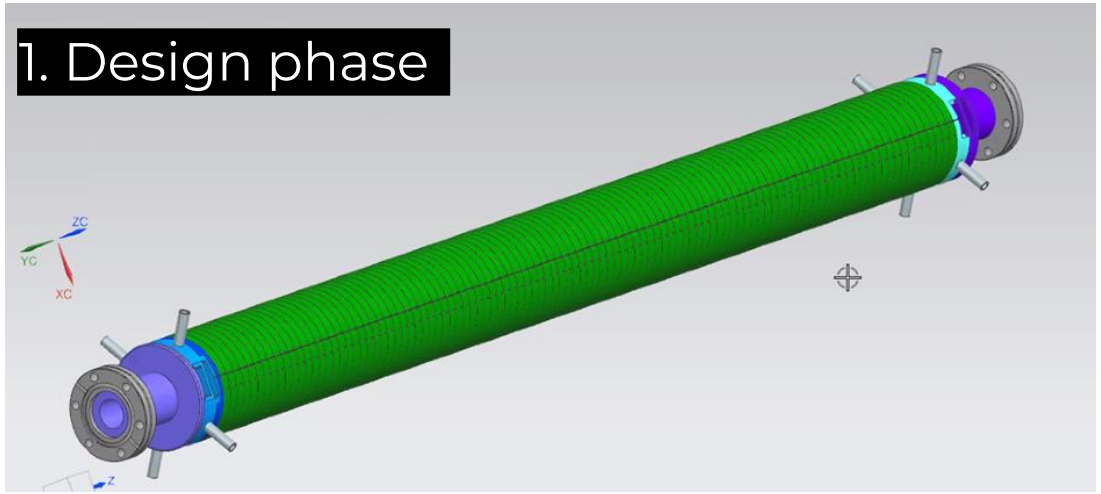


Travelling Wave gun design completed: cells and couplers under construction at VDL (expected final

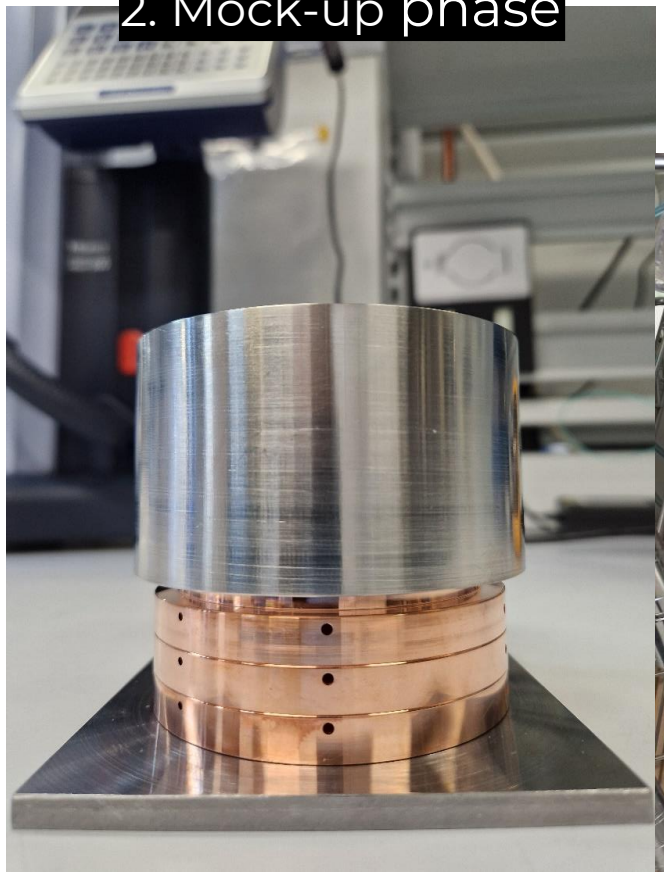
Task 7.5: X-band cavity prototype for compact light sources

Objective:
Build and test two prototypes of the X-band (12 GHz) accelerating structure designed for the CompactLight project.

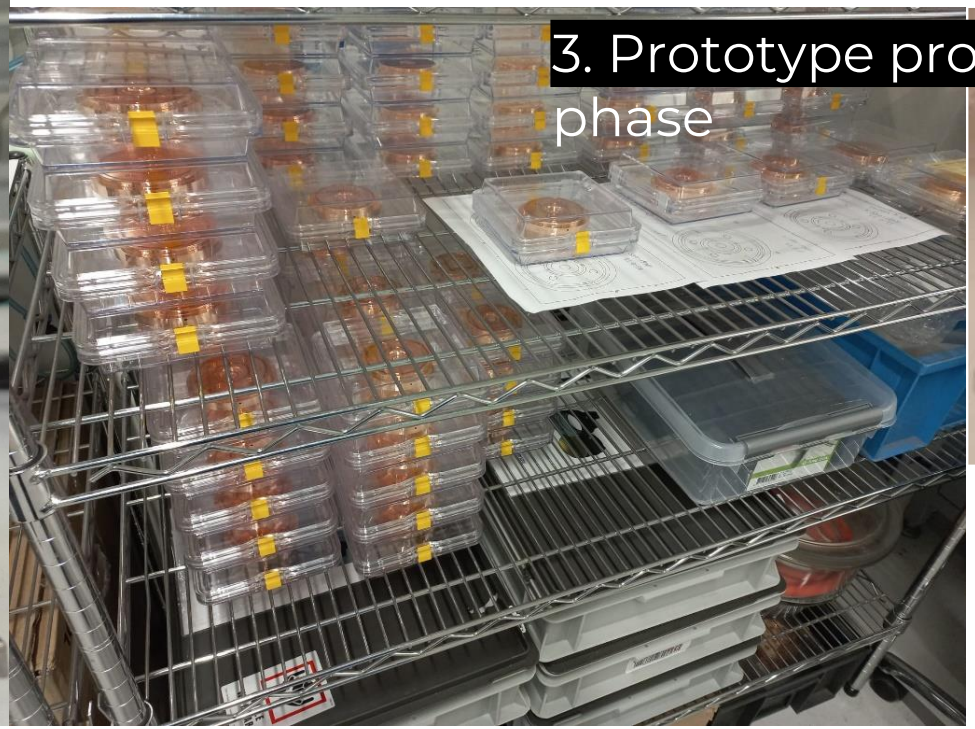
1. Design phase



2. Mock-up phase



3. Prototype production phase



The first structure will be brazed in January 2024 with low power RF tests beginning of February 2024.