

AccNet: Accelerator Science Networks – Task: RFTECH

With special emphasis on
“SRF subtask”

Objectives of RFTECH

- provide a platform for the information exchange and close collaboration between the European, and worldwide, experts on accelerator RF systems
- improve the design of RF cavities
- advance the state of the art in low-level and high-power RF systems
- optimize the integration of low-level RF, cavity design and high power
- develop RF costing tools
- define a strategy for RF test infrastructures

Description of work:

Exploitation of synergy on developments of high and low power RF systems for new accelerator projects

- RFTECH will coordinate and integrate the European development of radiofrequency (rf) technology for future particle accelerators and associated research infrastructures, in a worldwide context.
- RFTECH encompasses all aspects of RF technology, e.g. klystron development, RF power distribution system, cavity design, and low-level RF system, for linear accelerators and storage rings, including transversely deflecting (crab) cavities

The following institutes have expressed interest in the RFTECH activities

BNL (USA), CEA-DSM (F), CERN (INO), CI (GB), CNRS-LPNHEP (F), CNRS-LPSC (F), DESY (D), FNAL (USA), GSI (D), INFN-LNF (I), JLAB (USA), KEK (J), LBNL (USA), IFJ PAN (PL), PSI (CH), SLAC (USA), STFC (GB), THALES (F), TUL (PL), UJF (F), WUT (PL)

Crosslinks to other institutes via ...

- CERN consortia
 - SPL collaboration: TRIUMF, Soltan (PL), ...
- FP7 consortia
 - EuCARD (mainly Work Package 10: Superconducting RF technology for proton accelerators and electron linear accelerators);
<https://eucard.web.cern.ch/EuCARD/>
 - SLHC-PP
<http://info-slhc-pp.web.cern.ch/info-SLHC-PP/>
 - ILC-HiGrade
<http://www.ilc-higrade.eu/>
 - Institutes from not retained SRF Infrastructure proposal: BESSY (D), ...
- National Consortia
 - Physics at the Terascale Initiative (D)
<http://www.terascale.de/>
 - BMBF (D) Initiative (22 Oct 2008): TEMF Darmstadt, Uni Rostock, TUD, BUW, ...
http://www.bmbf.de/foerderungen/677_4321.php
- Other International Activities
 - TESLA Technology Collaboration Meetings
http://tesla-new.desy.de/meetings/collaboration_meetings/

Generic description of work

- annual workshops
- support attendance of, and participation in, worldwide RF events
- participation in laboratory tests and beam experiments
- support of visitors and of visitor exchanges between partner institutes
- involvement of summer students, technical students, PhD students and postdocs/fellows to support the network activities
- dissemination of network results by journal (or internet) publications and by seminars at partner institutes, conferences, and European universities

Specific Description of work for SRF infrastructures subtask

i.e. the **main objective** of the “SRF sub-task” consists in intensifying a **collaborative effort** between European accelerator labs with the aim of planning and later providing for **European accelerator users** a multi-purpose state-of-the art network of equipment for **R&D and test of SRF cavities and cryo-modules** **within 2 years**, to be presented to the **funding agencies**

Procedural method

very similar as for the preparation for EuCARD during 2007/8 (European SRF Infrastructure proposal)?

1. Identify and contact labs with SRF activities; compile **existing equipment**, its availability, **cost for refurbishment**, if needed
2. Identify in **future projects** making use of SRF, their host lab, timescale and specificities (operating frequency, gradient, Q-value, temperature, beam structure and current, ancillaries such as power and HOM coupler, tuner, cryostat,...)
3. Define for each future project the **required equipment** for R&D and tests
4. By comparing 2 and 3, identify **missing equipment**, for each project, both in **host and collaborating labs**, and figure out the **costs for acquisition**
5. Prepare a **project description** including required resources to be provided to funding agency after 2 years
6. **Coordinate SRF test activities**, if needed, already during the preparation phase

What was done during the preparation for EuCARD in 2007/8 (European SRF Infrastructure proposal)?

Possible future projects related to SRF

- The **Superconducting Proton Linac SPL** for the upgrade and partially replacement of the injector chain for the LHC;
- The **REX-ISOLDE and future EURISOL facility** by using the quarter wave cavities for the post acceleration of the radioactive ions;
- The **4th generation light source** using an **Energy Recovery Linac** and prototyping cavities for a future neutrino factory;
- **The International Linear Collider ILC** for the validation by RF power tests of the cryo-module prototypes;
- The **SPIRAL-2 at GANIL** heavy ion accelerator and the proton linac for **Accelerator Driven Systems ADS**.
- The **LHC** for reception tests of spares of 400 MHz niobium film cavities and cryo-modules.
- **Crab Cavities** for the **SLHC** (luminosity upgrade)

Coordination matters related to the AccNet - RFTECH - SRF sub-task

We need to

- organize the AccNet Internal Steering meetings, reporting lines, reviewing procedures, and supporting actions
- define communication and dissemination and create and maintain a WEB-site and appoint the Webmaster
- appoint a person in charge of the budget and allocation issues
- be open for new participants

Conclusion related to the AccNet - RFTECH - SRF sub-task

RFTech covers networking activities in LLRF, high power RF and SRF technology issues

There is a considerable coordination task ahead of us including a large number of European and International partners

The SRF subtask has a well defined goal to be achieved within 2 years: Define needs and costs for RF test infrastructure in view of future accelerator projects

Coordination and organisational issues should be decided rapidly