

# iSAS TA#3

## Energy savings from the beam

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### Goal of TA#3:

→ Design, build and test a high-efficient cryomodule from ERL application which will be the baseline for the next generation of cryomodule (→ INT#1).

### Synergies with others WP

❑ TA#1: Integration of FRTs & TA#2: Integration of multi-frequency (up to 1.3GHz?) and “high”-temperature (4.2K instead of 2K) cavities

→ Impacts on the overall design of the CM to be included from the beginning.

❑ Strong synergy with INT#1 (Goal: build the next generation cryomodule making it overall more efficient and versatile/universal for the future high-gradient/high-current accelerators by integrating all new designs of critical components (FRTs, High-Qo Nb<sub>3</sub>Sn cavities...))

### Advantages

- less design efforts (no need to start from scratch a new design...),
- less (or even no) prototypes needed (reduction of our environmental impact),
- important money savings thanks to the series effect and universal concept,
- less risks using as a baseline for this next gen cryomodule a well-known/proven design of already tested cryomodules...



## Status of today

- Very good and promising contacts with partners (INFN, ESS, CEA and CERN) and industrial (CNIM) and already some commitments...
- Still need of more discussions with CERN (on next Monday morning) and CEA (next week) to and also an industrial partner, CNIM (Feb 8<sup>th</sup>...too late?).
- Summary of the first discussions (areas of interest/commitment).

**INFN:** strongly interested in this joint effort. Synergies with BriXsino (Linac).

They proposed to play a role in:

- Tuning systems
- HOM couplers
- Cavity design/fabrication → strong link with local industry (→ industrial to be contacted for INT#3?)
- Design of the CM

→ Commitment on matching funds: 100k€

NB: Possibility to get access to the existing vertical cryostat for cavity testing (within the Euro-lab)



## Status of today

**ESS:** fruitful meeting this morning with Mats

Very positive answer to be involved in this project. Already gave the name of Paolo Pierini as the contact person for ESS (Role to be defined within the project)

Provisional agreement (to be further refined...)

- Hosting the CM testing phase in their Test Stand 2 area at Lund.
- Participation to the CM design → synergy this ESS upgrade!
- Important point: availability of the prototype medium-beta cryomodule (without the cavity string).  
First feedback from Gilles Olivier → 99% of compatibility with our needs. Remaining 1% and refurbishment to be studied more in details.

→ Discussion with Paolo next week.



## Status of today

**CERN:** first contact with Frank Gerigk this week.

Improve the overall CM efficiency!

- HOM couplers and RF couplers: study of cooling strategies to save energy and optimize the power extraction from HOMs
- CM design optimization to reducing the static losses

→ Further discussions next Monday with Vittorio Parma. (Need to find someone from CERN on HOMs).

**CEA:** first contact this week with Christophe Mayri.

Discussions on:

- Design and assembly of the CM: important feedback from ESS medium & high-beta CM assembly for CM design optimizations (to reduce the static losses for example)
- RF Couplers: important feedback on the RF design & conditioning process (NB: baseline for our ERL application is the existing ESS coupler design).

→ Need further discussions (to be planned next week).



## Breakdown Structure of the WP

Nothing yet decided...open to discussion/comment...

But it seems that it could be split into 4 WPs

- WP3.1: HOMs damping and Fundamental Power Couplers design and optimization
- WP3.2: Design of the CM
- WP3.3: Fabrication of the CM components including critical ones (cavities, HOMs, FPCs and Tuners)
- WP3.4: Assembly and test of the CM