Stochastic cooling system @ NICA state of affairs, February 2024

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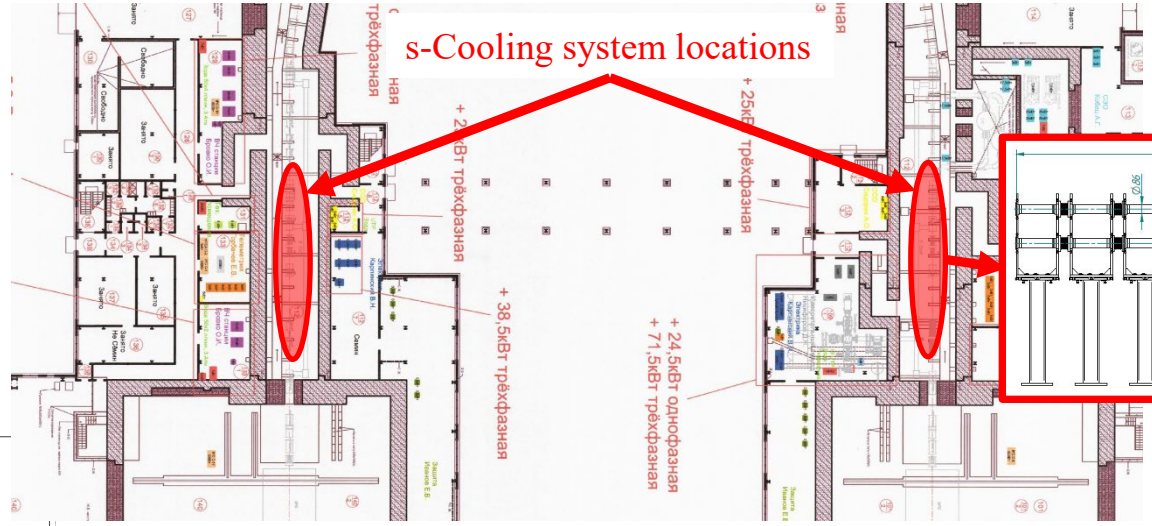
on behalf of JINR LHEP collaboration

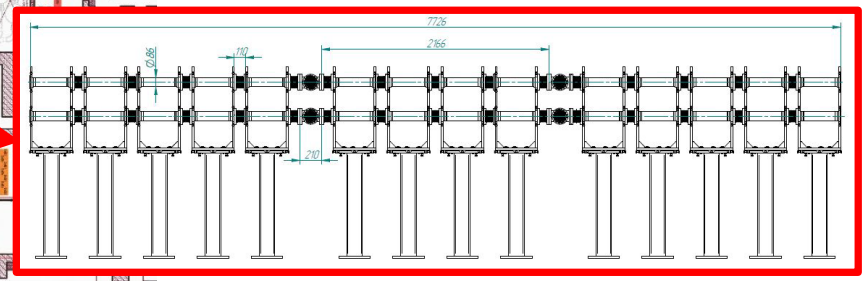
Introduction

This is a brief summary about the development progress of the Stochastic Cooling System (SCS) for the NICA collider. The main intention of the summary is to provide all involved parties with general overview of the SCS state at February 2024.

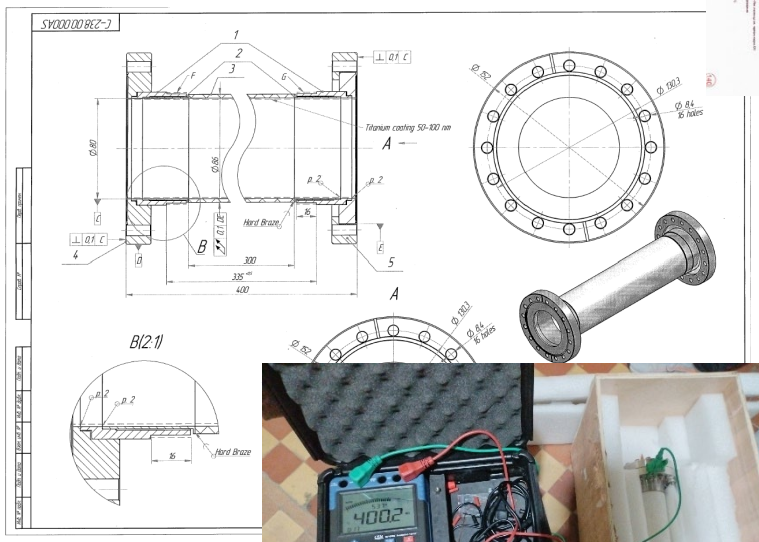
Vacuum block

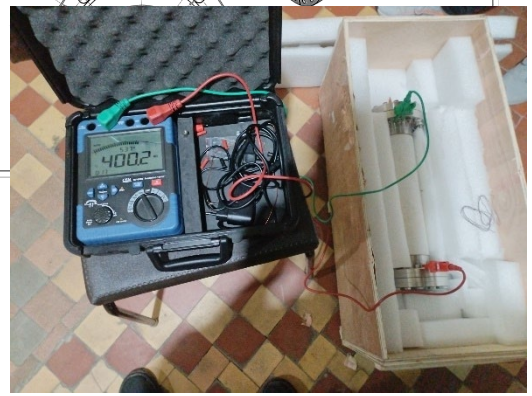
Stochastic cooling system is not necessary for the first collider Run, however, the vacuum still MUST be closed. In essence, closing the vacuum is the only mandatory part for the 2024.





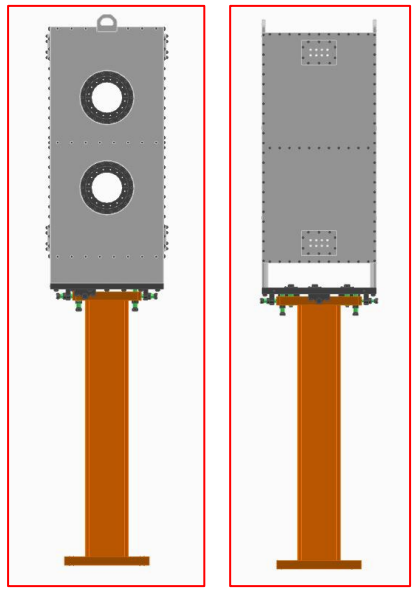
Ceramic tube





- there were some problems with vacuum (solvable)
- there are problems with coating
- 2 are already here, another 32 on the way (probably)

Supports for the ceramic tubes

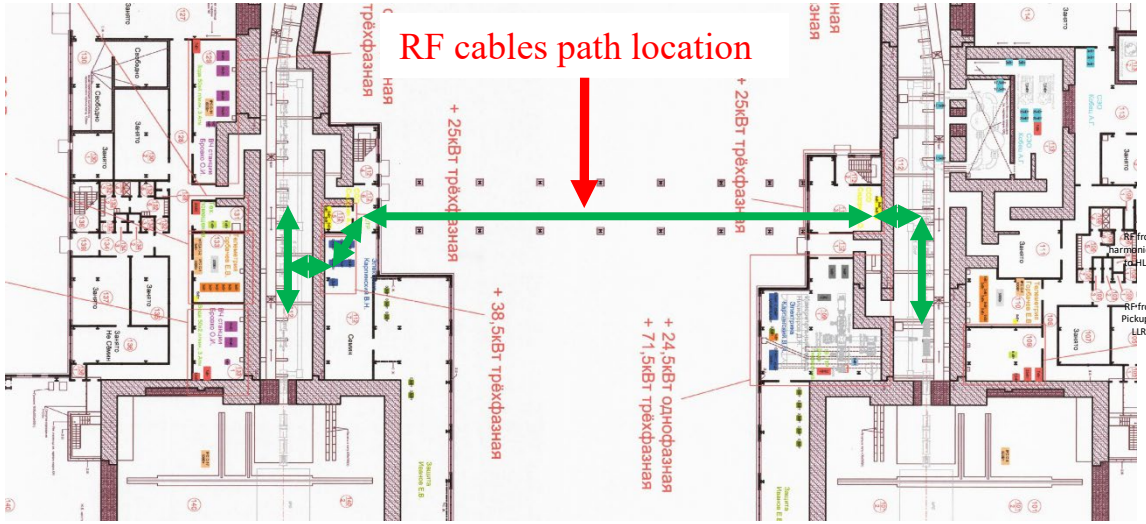


- the design was finalized
- the acquisition procedure was initiated for the prototype
- we have to start procedure for the 30 units in parallel to save time.

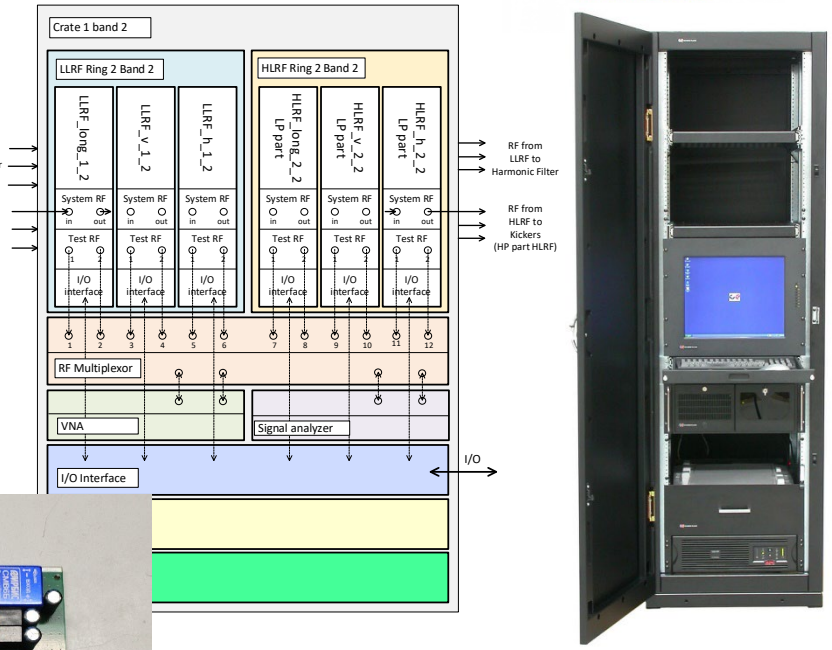
RF cables

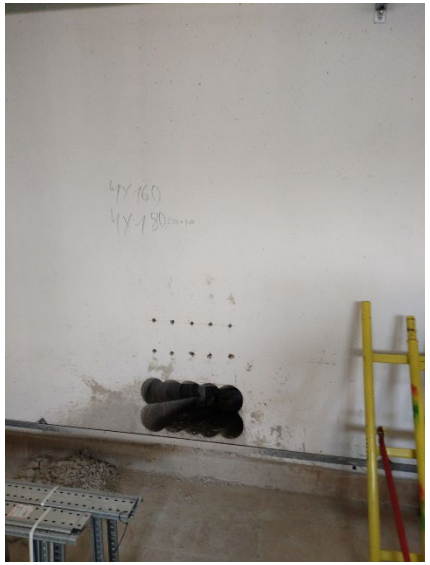
The acquisition procedure for the RF cables was initiated. Next step is the acquisition of the 19” racks, that will host s-Cooling electronics.

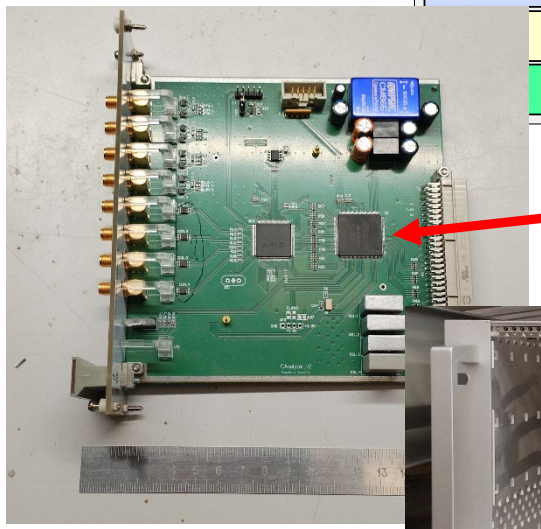
Cables path



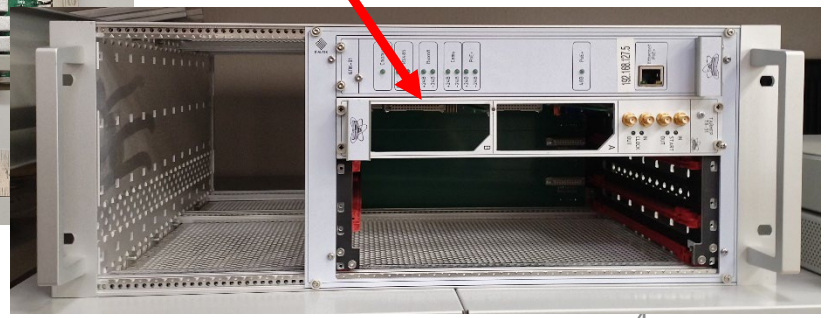
Standard 19” electronics racks





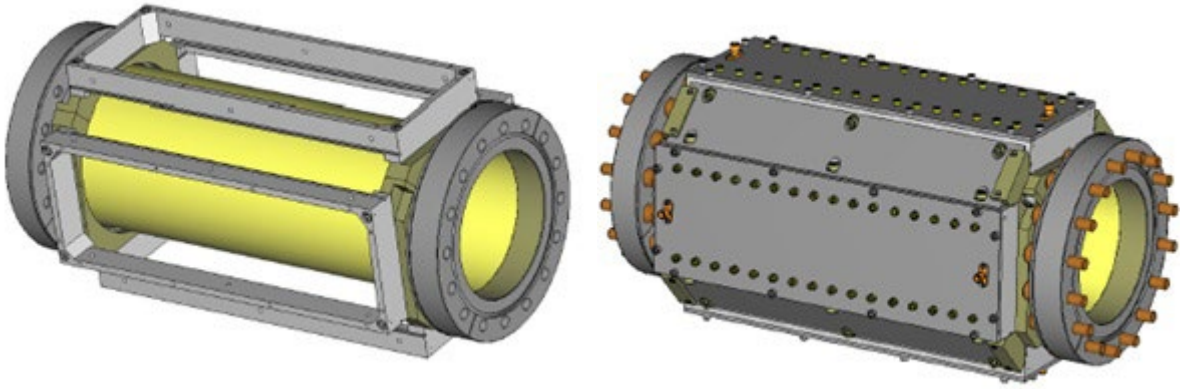


Existing slow-control system

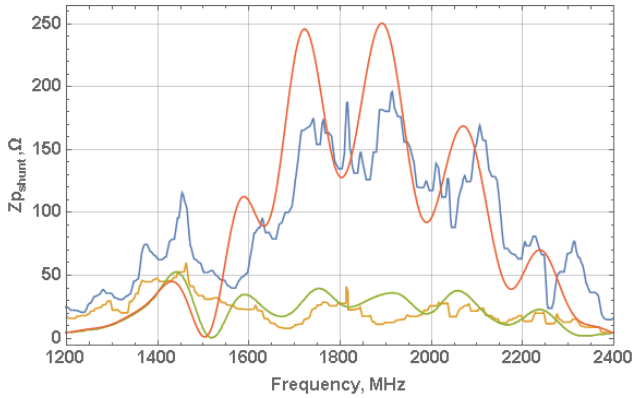


PickUp's & Electronics

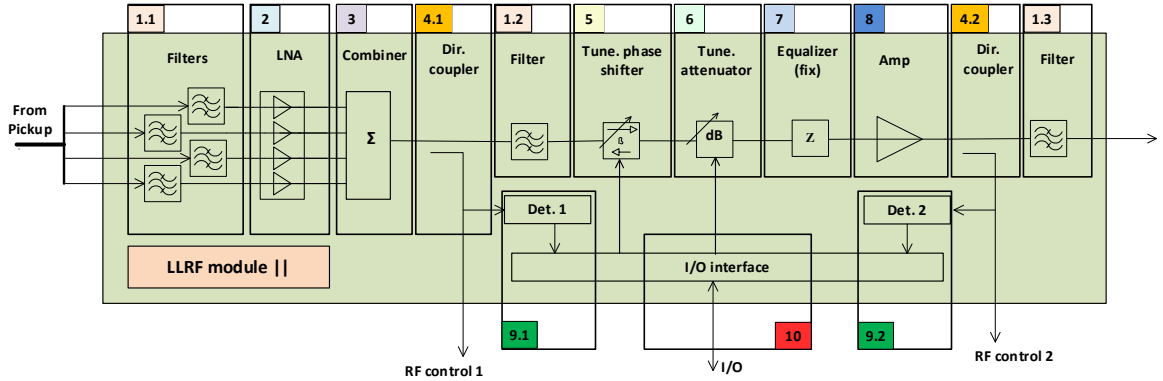
PickUp @ Nuclotron (example)



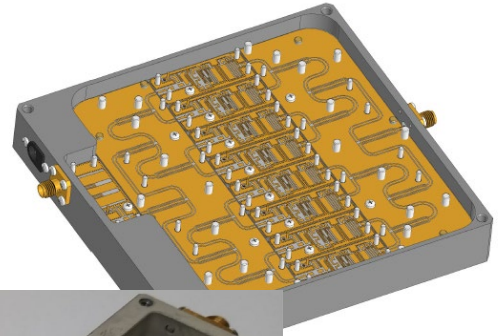
- PickUp RF design was tested at Nuclotron (successfully).
- for now in dormant state

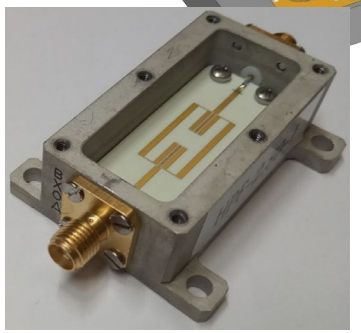


Electronics RF block (example)



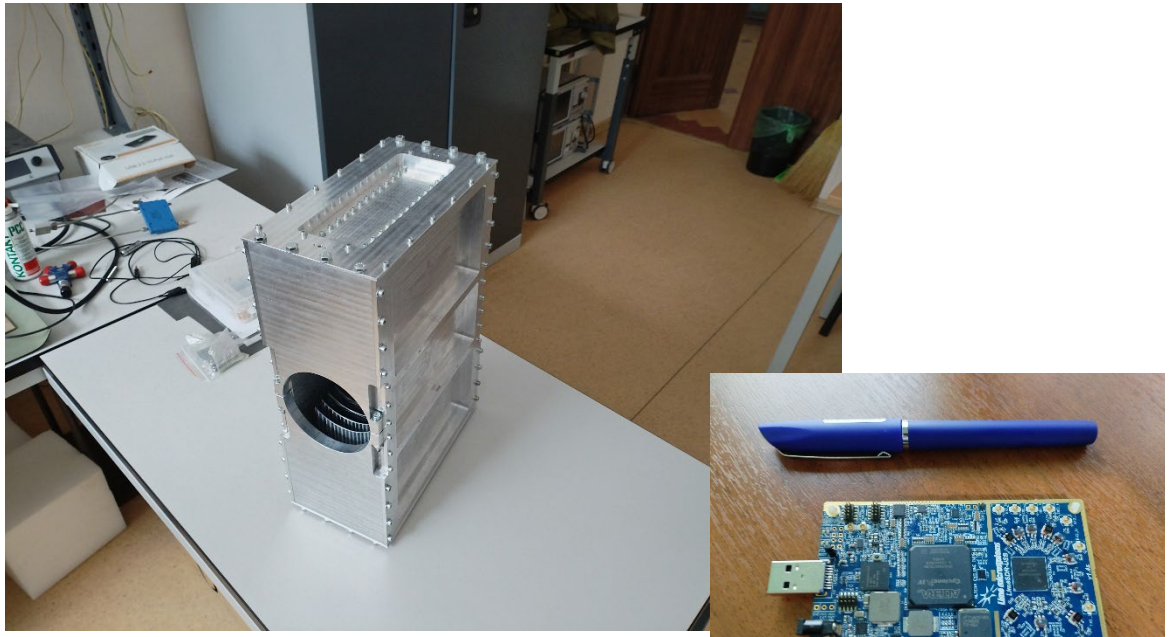
- s-Cooling electronics is based on the slow-control pattern, used for the synchronization system
- currently work in progress … (LLRF)
- the only outsourced electronics component is RF filter. Contract with ITMO is in negotiation state.





Software & Schottky noise @ Booster

Schottky noise diagnostics @ Booster (educational purposes)



- still needs to be installed @ Booster
- designed for 65 MeV/n range
- will be paired with LimeSDR digitizer

Software

Thank You!