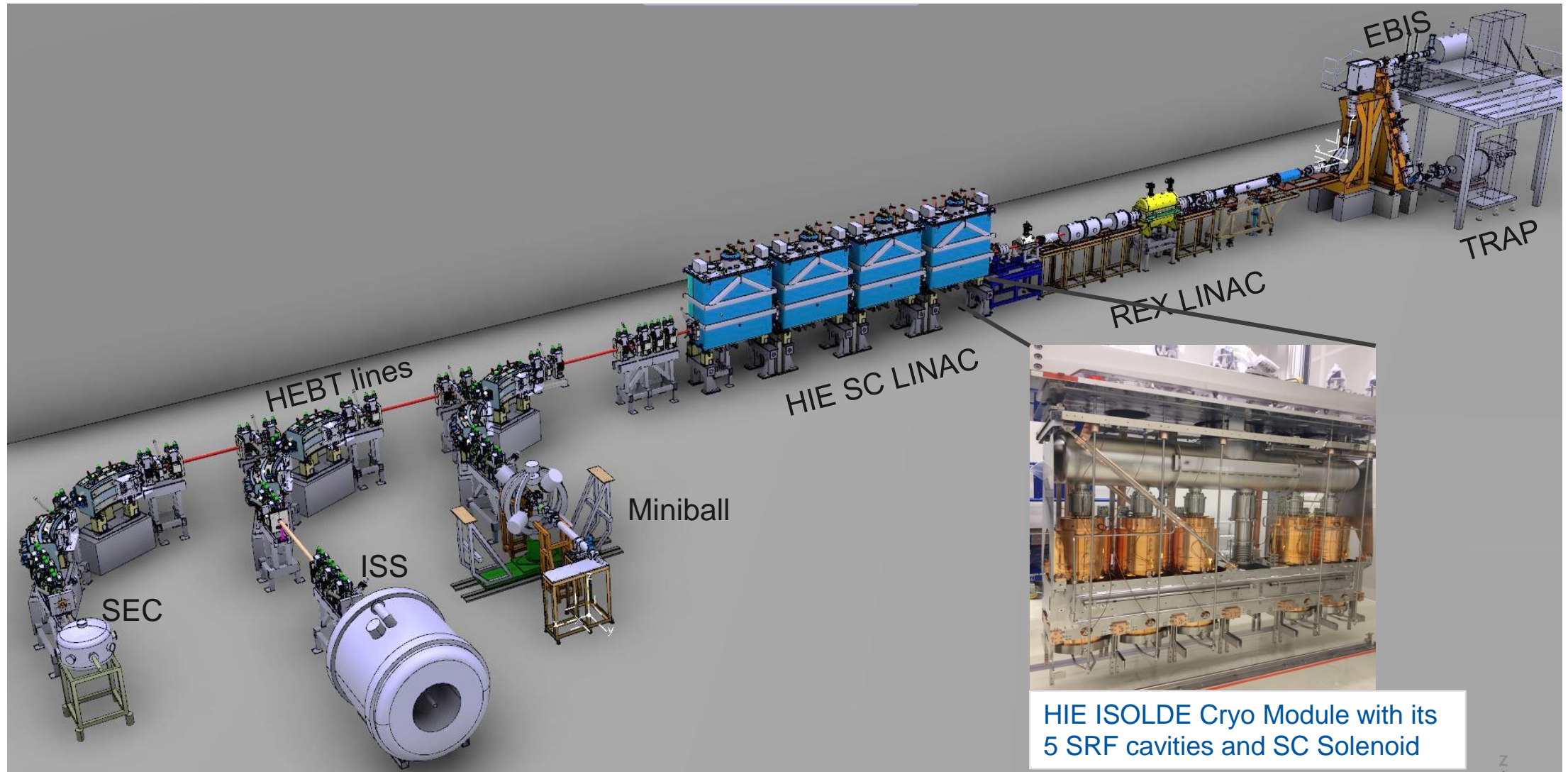


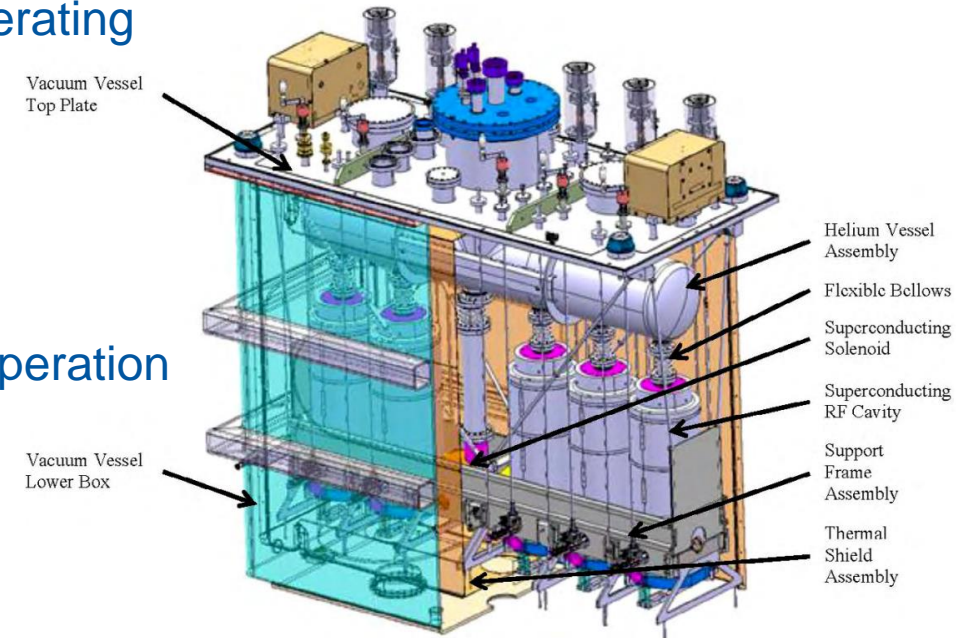
Cryo tests for HIE ISOLDE during cooldown period:



HIE ISOLDE Cryo Module with its 5 SRF cavities and SC Solenoid

Reason behind Cryo/SRF LN2 simulation tests:

- Since the start of HIE ISOLDE in 2015 the SRF cavities show signs of degradation. The overall performance of the machine in terms of accelerating gradient has gone down to ~70% in 2023.
- The main cause is believed to be the yearly Warm-up/Cooldown cycle of the facility affecting the Nb layers of the SRF cavities.
- The present infrastructure and Cryo plant do not allow 24/7 365 days operation and requires a full thermal cycle and recommissioning of the SC Linac.
- A possible alternative could be to cool the CM thermal shields permanently at using liquid nitrogen.
- Tests were conducted at the end of the '23 run which gave insight in the temperatures behavior of the Cryo Modules but there was not enough time to characterize the RF performance of the SRF cavities.

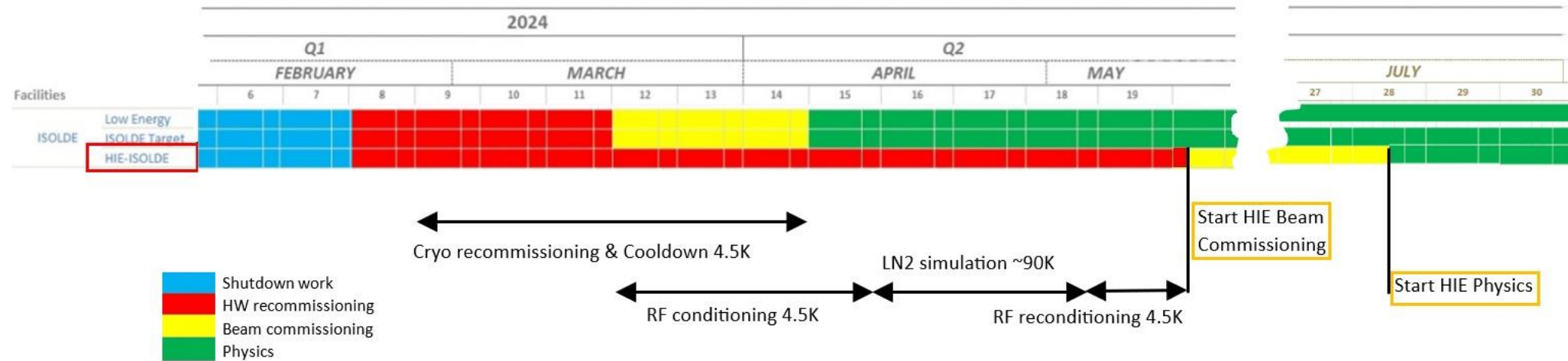


HIE ISOLDE Cryo Module with its 5 SRF cavities and SC Solenoid

Cryo/SRF LN2 simulation tests during cooldown:

- The duration of a full Cryo/SRF test is ~ 5 weeks.
- Thanks to optimization of the cooldown sequence as well as introducing of a new SRF conditioning procedure by the Cryo and RF specialists, we are in principal able to include the Cryo/SRF LN2 tests in the HIE ISOLDE start-up planning such that the date for the start of Beam Commissioning as well as HIE ISOLDE Physics can be maintained. A prerequisite is the availability of the Cryo and RF specialists.
- Validation of this planning with the Cryo, RF and Vacuum groups is in progress.
- If the outcome of the tests are positive and a LN2 system is implemented the advantages would be:
 - No full thermal cycle preventing mechanical stress on the Cryo Modules components
 - Better overall vacuum conditions, no pollution installing on the Nb layers
 - Shorter Cryo and SRF recommissioning time resulting in a longer physics period
 - Stop or reduced degradation of the SRF cavities over time

Best scenario planning Cryo/SRF tests:



Best scenarion planning Cryo/SRF LN2 simulation tests at start-up

- **Key dates assuming the proposal is validated by the groups:**

- 21th May 2024 – Start of HIE-ISOLDE Beam Commissioning
- 21st June 2024 – HIE ISOLDE stable beam to exp. Stations
- 11th July 2024 – Start of HIE ISOLDE Physics
- 28th October 2024 – End-of-Protons (extended run discussions ongoing)
- 4th November 2024 – End of HIE ISOLDE Winter physics (depending on p-stop)