



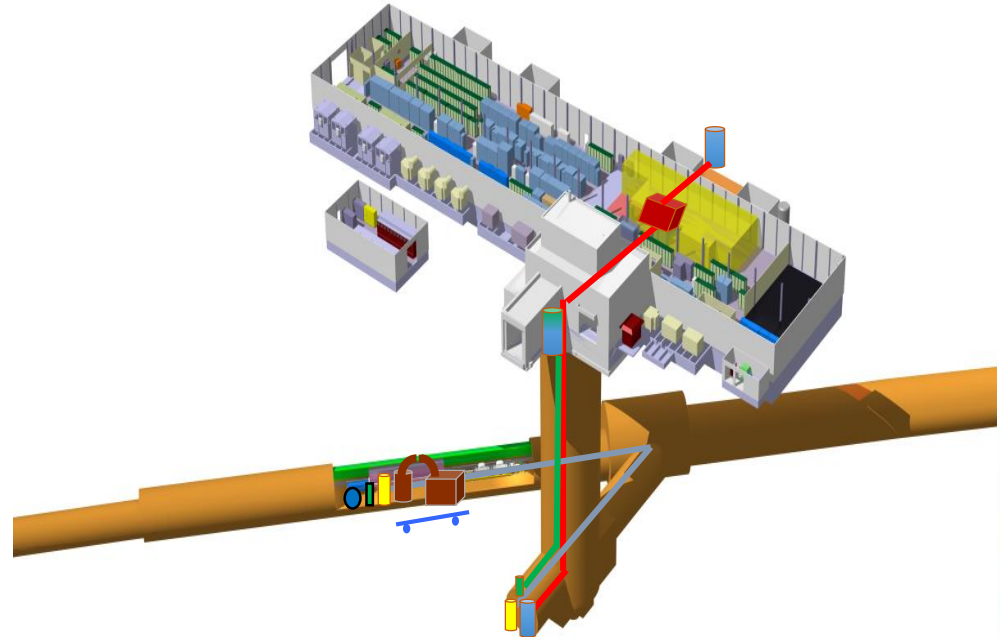
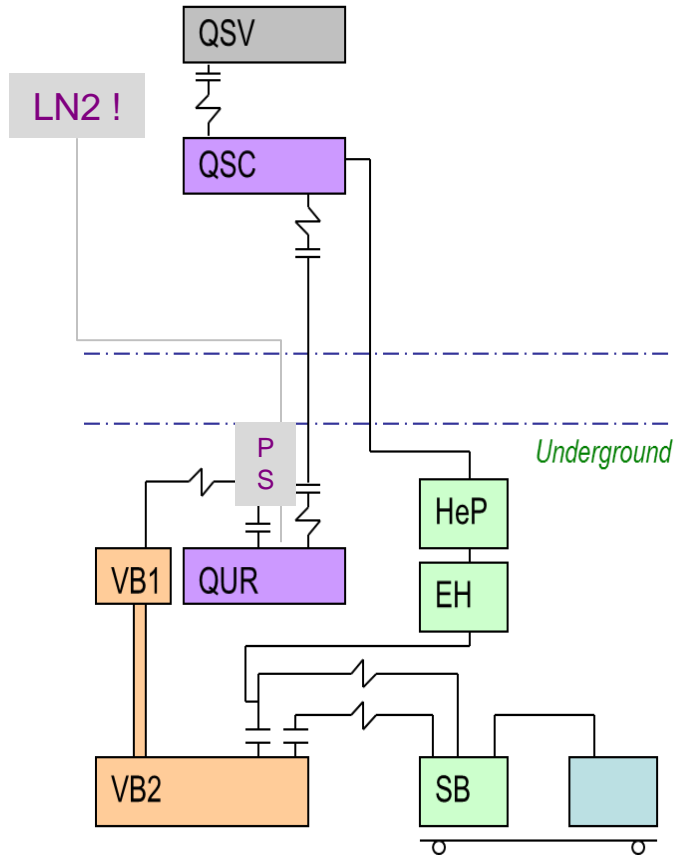
SPS-BA6 Cryogenics, Update on situation Mid August'18

S. Claudet (TE-CRG)

On behalf of WP9 team and Cryogenic group

16 Aug 2018 - CERN

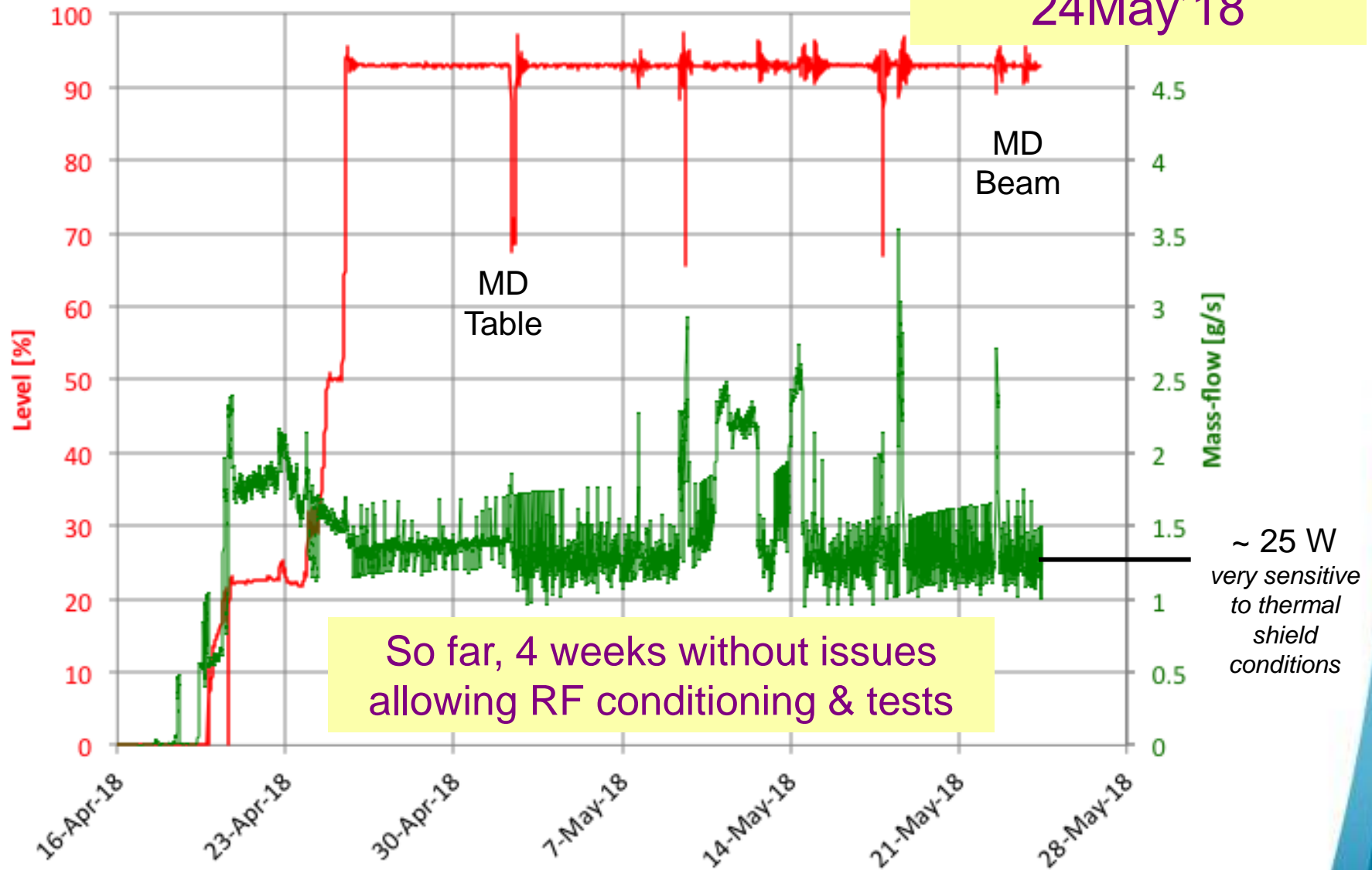
SPS-BA6 Cryogenics



New Cryogenic facility for superconducting RF tests with beam (SPS-BA6)

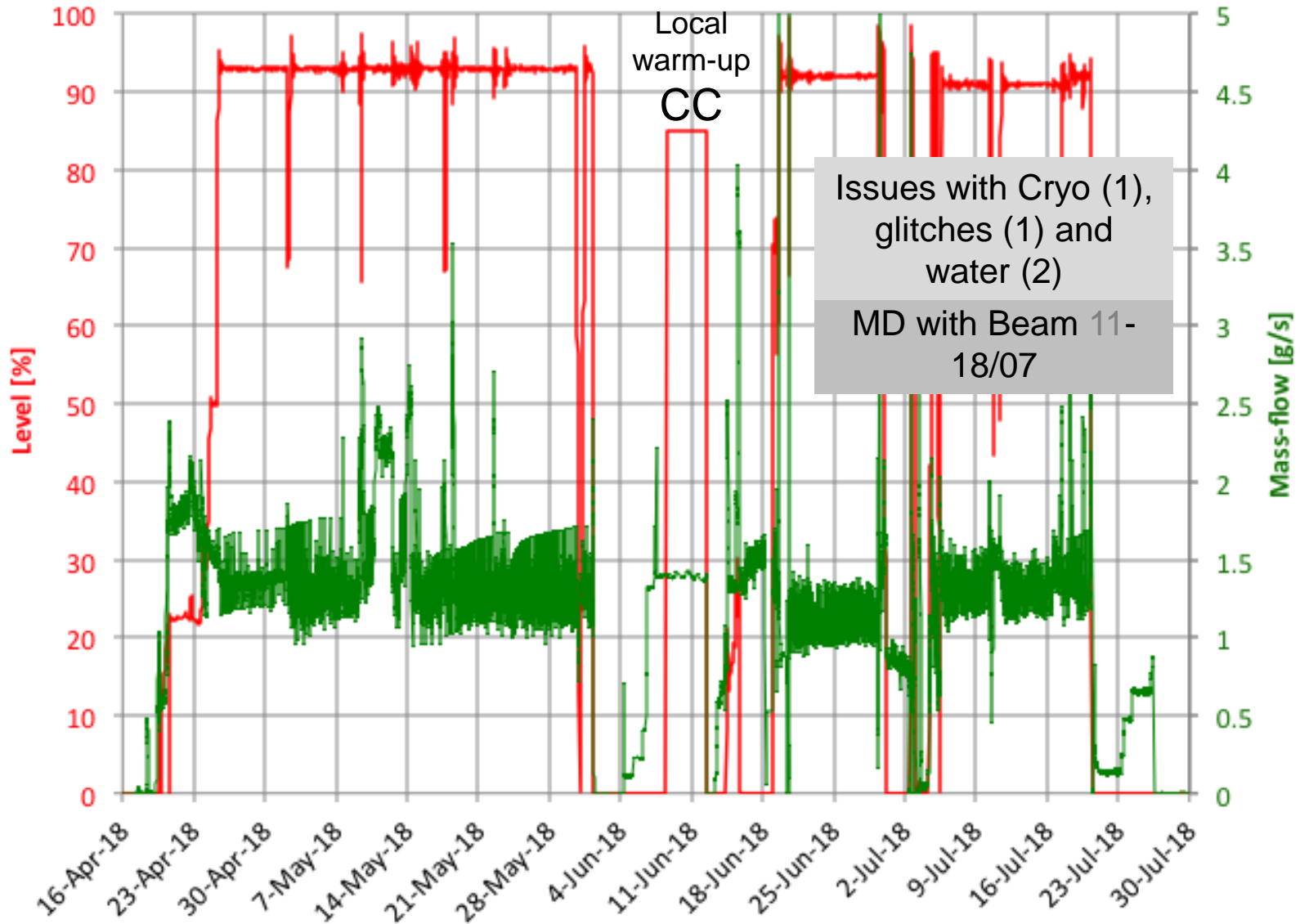
CC operation @4.5K

HiLumi-TCC#50
24May'18



CC operation @4.5K so far

During 2018_Run1, only preparatory 2K tests done end of Jun'18



Summary

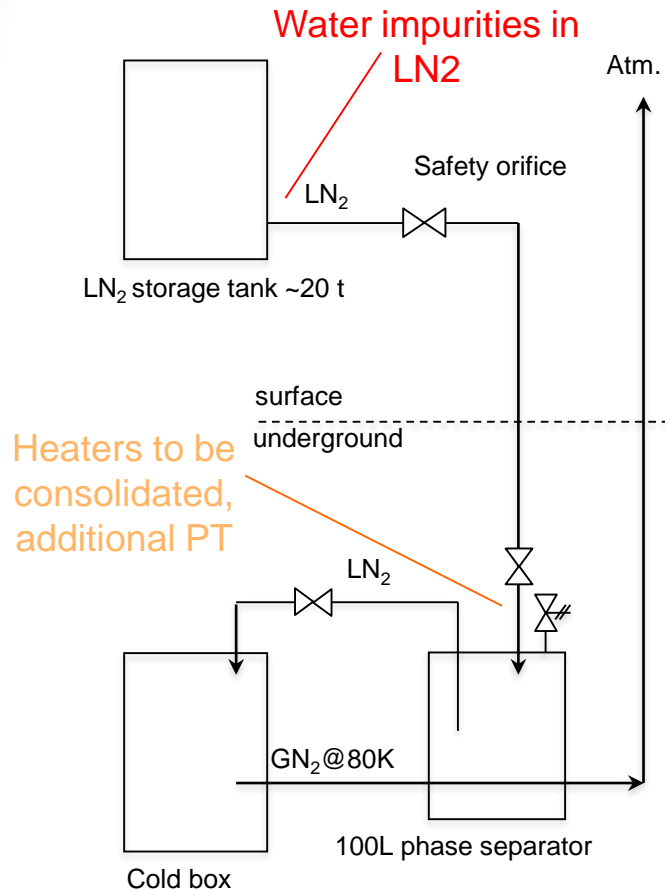
HiLumi-TCC#50
24May'18

- **Project study phase done in emergency** - *“late decision” on capacity and location* - with part-time (and sometime junior) staff, based on basic choices for interfaces and industrial standards as much as possible to keep performance and timing
 - **Difficult installation (Ph2-YETS17-18) and commissioning** with over-crowded zones and limited access, with huge workforce required, allowing so far only 4.5K operation
 - **Pumps for 2K operation to be commissioned during next TS** (19Jun'18) or longer stops – if any -, not much freedom or alternative, we will do our best
- **Pumps started and operated for some hours at end of Jun'18** (*they work and we did not see air leak into Helium sub-atm circuits – so far!*)
 - **Control logic to be further developed and tested**
 - LN2 for treatment against air impurities mandatory, **not ready at the time**

Perturbation with LN2

HiLumi-TCC#50
24May'18

Operational problem:



Presented at the 2nd CC MD, K.Brodzinski 2018.05.08

The SPS cryogenic cold box requires LN₂ installation for boost of capacity and cleaning of impurities in helium circuit with 80 K adsorber. The safety orifice installed on the outlet from the storage tank is regularly clogging with H₂O impurities present in the storage tank, blocking circulation of the N₂ in the system.

- Temporary fix implemented Spring'18 (periodic cleaning of line, LN₂ unavailability 3-4 days to 1-4 days, not fully satisfactory)
 - Complete warm-up + drying of LN₂ tank done end of July'18 at end of 2018_Run1
 - Now back into operation
- => Next refill foreseen Mon21st-Tue22nd ...

“smooth” transfer Project to Operation

Initial commissioning
Project-Operation
Spring 2018

Transfer Phase
Operation+Project
Now till Nov'18

Future operation phase
(Project as back-up)
2020 onwards

From: **Serge Claudet** Serge.Claudet@cern.ch
Subject: SPS-BA6, Cryo status mid august'18, new interfaces & perspectives
Date: 9 August 2018 at 17:36
To: Rama Calaga rama.calaga@cern.ch, Giovanna Vandoni Giovanna.Vandoni@cern.ch, Eric Montesinos eric.montesinos@cern.ch, Frederic Killing frederic.killing@cern.ch, Ludovic Alaux ludovic.alaux@cern.ch, Sigrid Knoops Sigrid.Knoops@cern.ch, Nicolas Guillotin nicolas.guillotin@cern.ch, Philippe Gayet philippe.gayet@cern.ch, Krzysztof Brodzinski krzysztof.brodzinski@cern.ch, Laurent Paul Delprat laurent.delprat@cern.ch
Cc: Frank Gerigk frank.gerigk@cern.ch, Erik Jensen Erik.Jensen@cern.ch, Dimitri Delikaris Dimitri.Delikaris@cern.ch

SC

Dear RF colleagues, dear all,

After the first run this spring of our new cryogenic facility for the new superconducting RF test facility at SPS-BA6, we conducted a technical stop the last few weeks about to terminate now.

The **main technical activities conducted** concerned the LN2 circuit (emptied, dried, and refilled this morning) and some corrections of the compressor system (valves, control logic, oil removal system with a last inspection this Fri 10th/08).

Besides, we **organised the transfer from “Project” to “Operation & Maintenance”** after having reviewed all project documentation and operation guidelines.

From now on, the proposed interfaces will be:

- Operation matters: Ludovic ALAUX

Ludo was with us since beginning of installation phase in January'18 and is fully aware of the situation with this specific installation, as you have seen during the past months. He will coordinate the operators on daily basis if needed. This is the way cryogenics is operated for test benches (like SM18) or SPS related cryogenics (North area detectors, BA4_Coldex), with as well Nicolas GUILLOTIN as Operation engineer in the CRG-ML team lead by Philippe GAYET
For an efficient operation service for next run this autumn, the cryogenic operation team will be supported by the former project engineers as Best Effort service. This concerns Laurent DELPRAT, Krzysztof BRODZINSKI and Serge CLAUDET.

- Project team: Krzysztof BRODZINSKI

As you know Krzysztof has been your interface for all the preparatory phase in the past years, and will continue to support you for CC related specific interfaces.

Besides, he will take care of terminating the 2K commissioning soon and ensure the transition of this part as well to operation when possible.

I could only recommend that **any further communication** for operation matters, schedule, coordination be **addressed to both of them**. And to avoid any mis understanding, I will of course remain involved for general HiLumi coordination about SPS-BA6 if WP9 is concerned and Krzysztof remains the interface for CC@P1/P5. We will conduct necessary consolidations during 2019 (as committed during TCC#50 held 24May'18) and be able to resume operation and tests in 2020 when it will be required.

For the **second run to start next week for cryogenics** in order to cover the 4 remaining Machine Developments of 2018, we will restart Mon13th/08 as foreseen and proceed with 2K commissioning when conditions will permit. We should know around Tue 21st/08 if we can continue as expected or if/what/when could need fixing (LN2 refilling to guarantee continuous treatment against impurities for a sub-atmospheric process and HW/SW for 2K pumps).

As communicated with Rama in July, this would provide at best 5 working days before next MD 29/08 when you required 6 days for conditioning and LLRF activities. **The situation will have to be evaluated, with so far scheduled MD's for CC: 29/08, 05/09, 10/10, 17/10**

On behalf of all cryogenic teams involved in this endeavour to complete design, installation and commissioning of this new facility, **we wish you all possible success with your developments** for Crab Cavities on proton beams, and will be happy to continue developments of superconducting RF with beam in the future!

Bien sûrément,
Serge Claudet

PS: this message will be part of the AOB at next TCC#55 to be held 16Aug'18

2nd run started this
Monday 13Aug'18,
including training of
more Cryo operators

Situation right now:

- CBox: 50K
- VB1: 100K
- VB2: 250K
- CC: 300K

2K tests + LN2
refill to start next
Monday
20Aug'18,

with possible 2K
continuous
operation from
Wed 22nd
onwards (t.b.c)



16Aug'18

HiLumi Cryogenics (WP9) SPS-BA6, status



16Aug'18

HiLumi Cryogenics (WP9) SPS-BA6, status

HiLumi - SPS-BA6 – New cryo/supra RF test facility

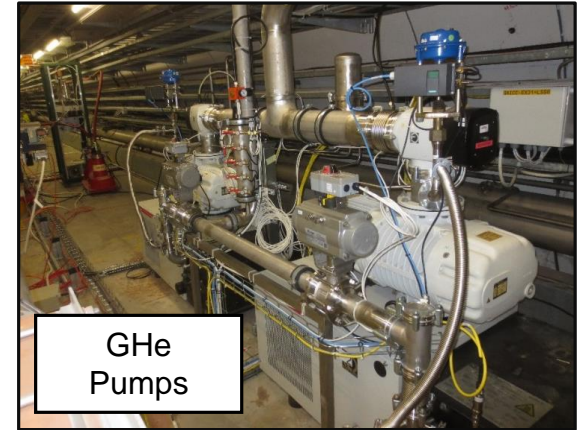
Helium gaz storage



Liquid Nitrogen

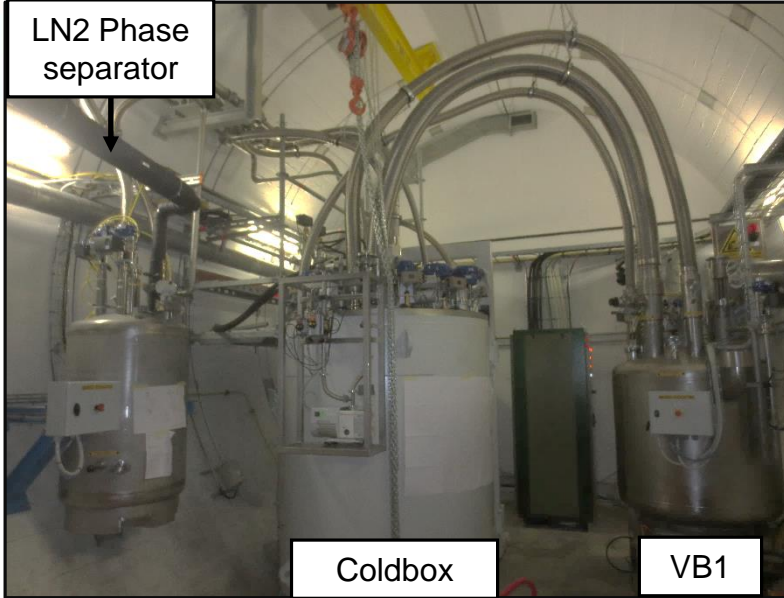


Compressor



GHe Pumps

LN2 Phase separator



Coldbox

VB1



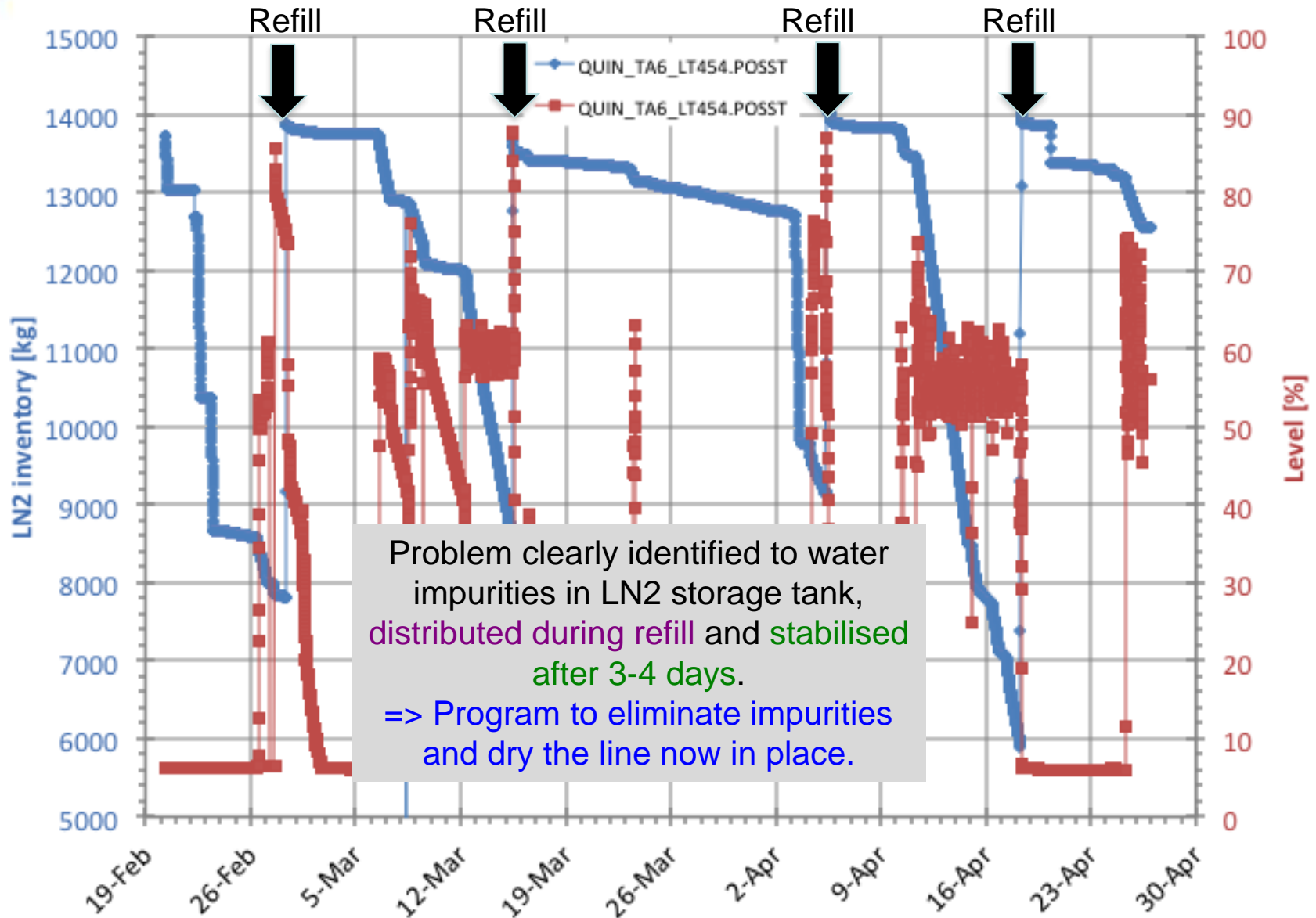
80m cryogenic line, EYETS

Flexible line between fixed box and moveable table



7 industrial contracts complemented with local piping, cabling, controls now installed before tunnel closure at the end of YETS

SPS-BA6 - LN2 refill issues



Cryodistribution P&I_D

IT-4189: Drawing 2

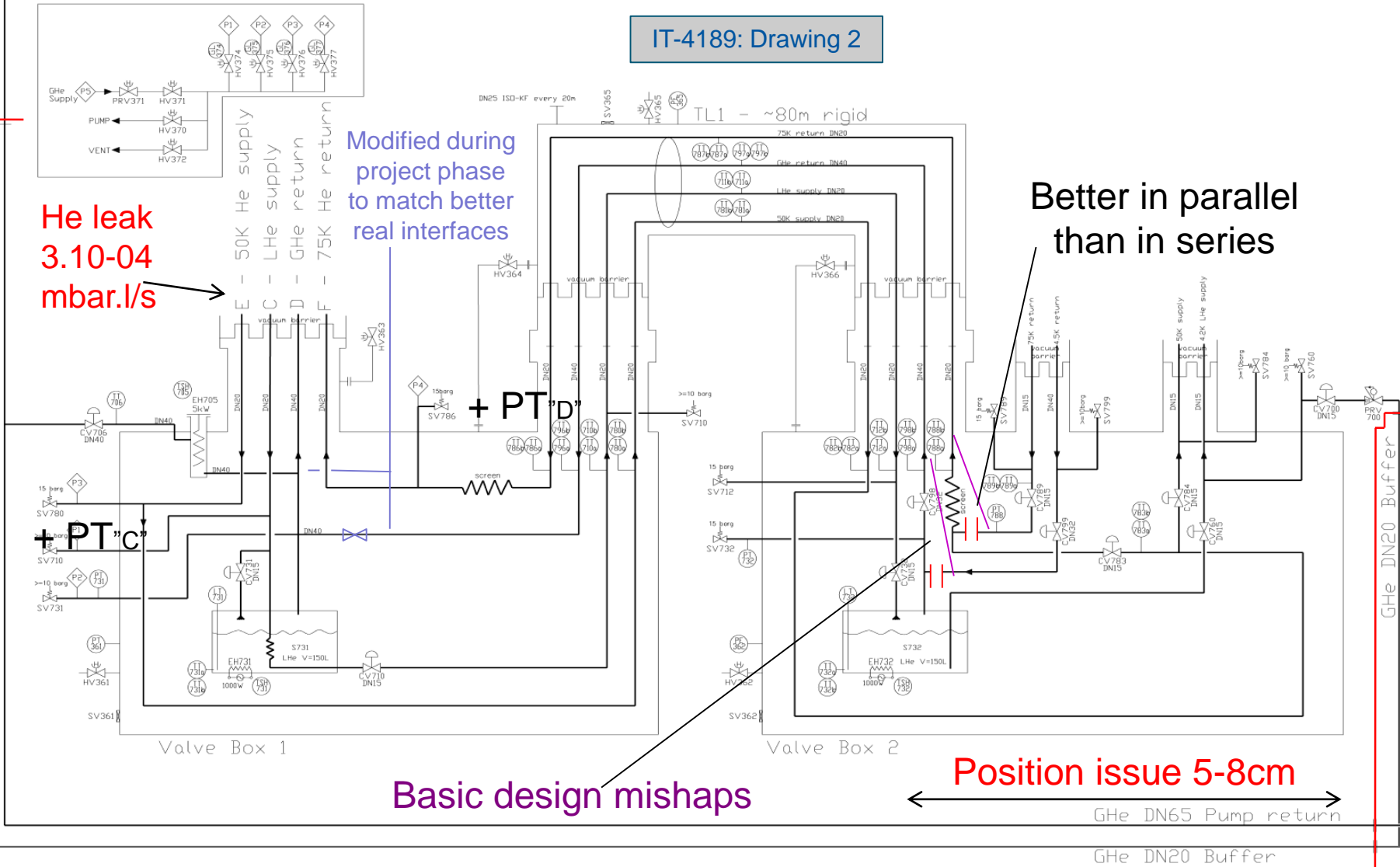
He leak
3.10-04
mbar.l/s

Modified during
project phase
to match better
real interfaces

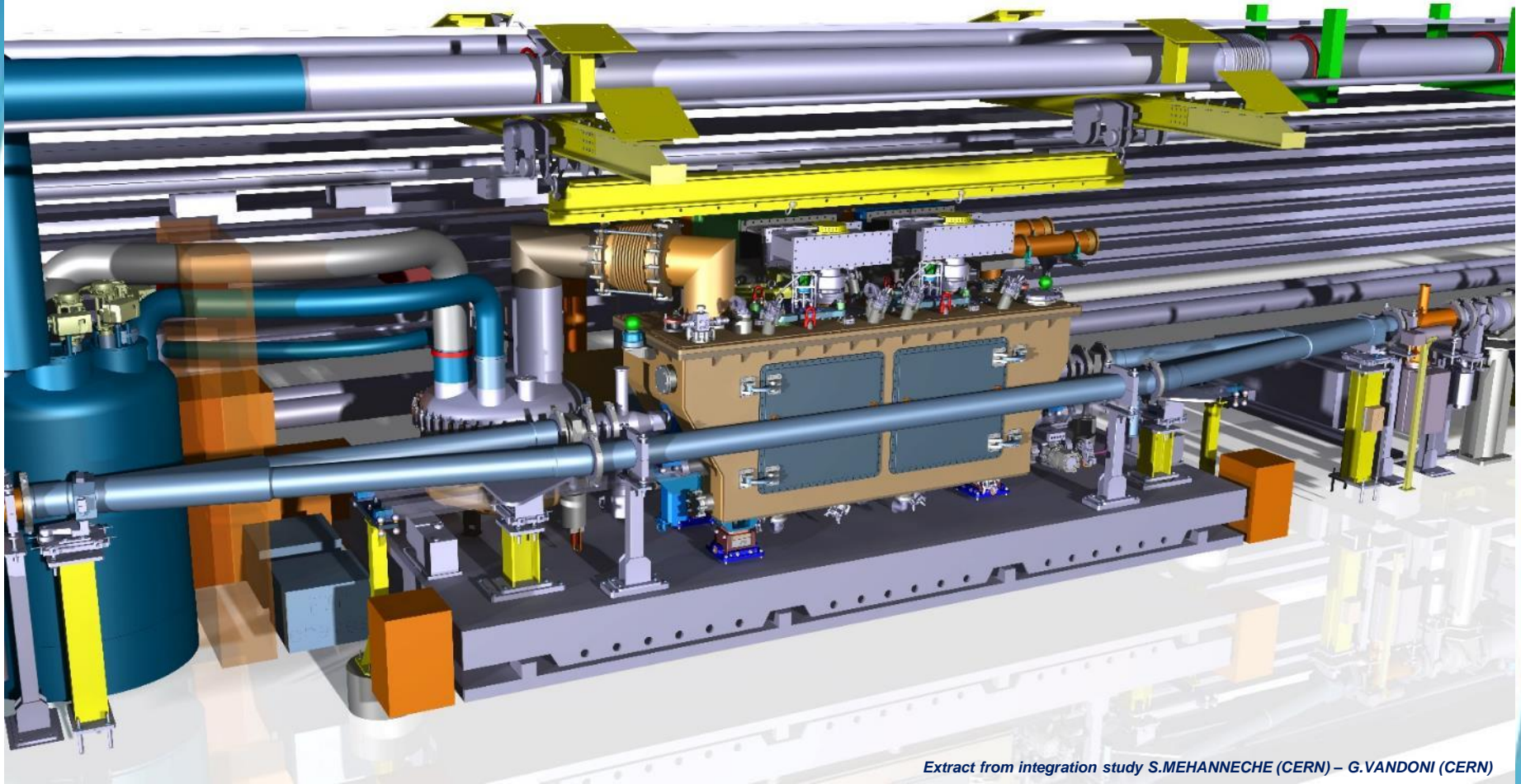
Better in parallel
than in series

Basic design mishaps

Position issue 5-8cm



Cryomodule integration overview



Extract from integration study S.MEHANECHE (CERN) – G.VANDONI (CERN)

Cryomodule preview

