



# Plasma source installation constraints for Run 2

Ans Pardons, CERN

AWAKE collaboration meeting March 2018

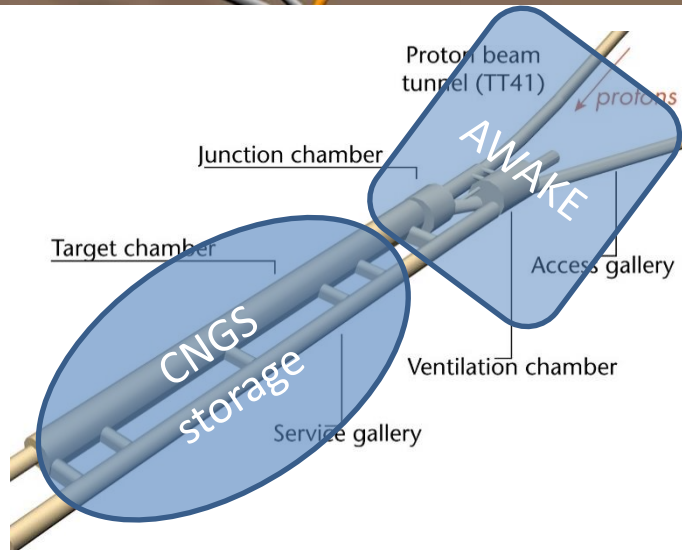


# Outline

- CNGS underground area
- CNGS target cavern
- Dismantling of CNGS target cavern
- Mini-dismantling of CNGS target cavern
  - Current experimental area layout
  - Different possibilities for “Start of Run 2” layout
- Conclusion = input needed



# CNGS underground area



- 1km long access tunnel from SPS point 4 down to AWAKE experimental area
- Slope = 6%, i.e. from -60m to -120m depth
- Minimum passage cross-section = 2.2mx2.2m
- Target chamber partially used by AWAKE run 1, **~100m length remain, but is now filled with CNGS elements**
- Service gallery in parallel to target chamber (radiation shielded).

# TCC4 cavern 2017



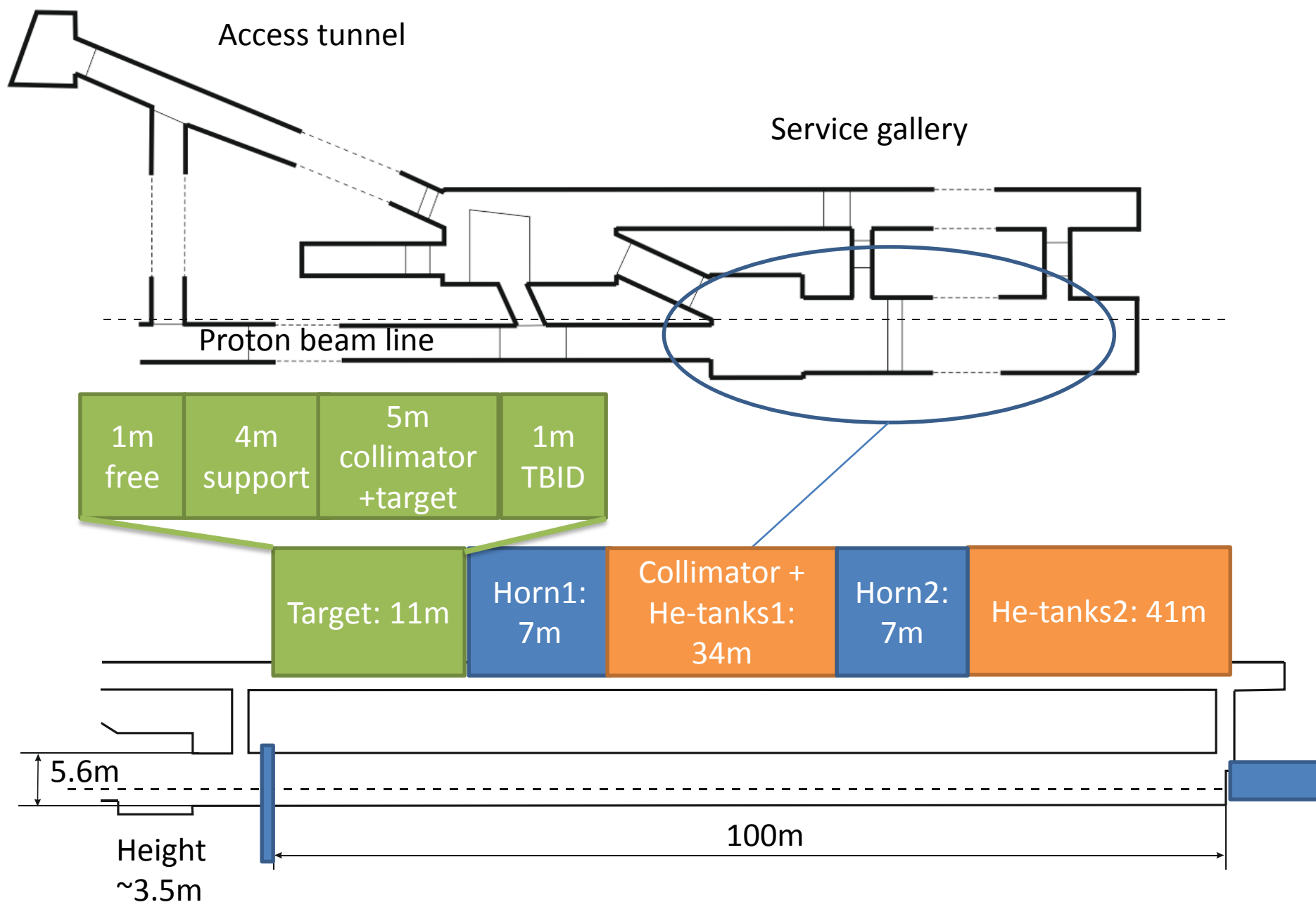
- TCC4-AWAKE is separated from TCC4-CNGS by ventilation/shielding wall
- All radioactive CNGS elements are still in place behind the wall (incl. shielding, target, horns)





# TCC4 cavern empty

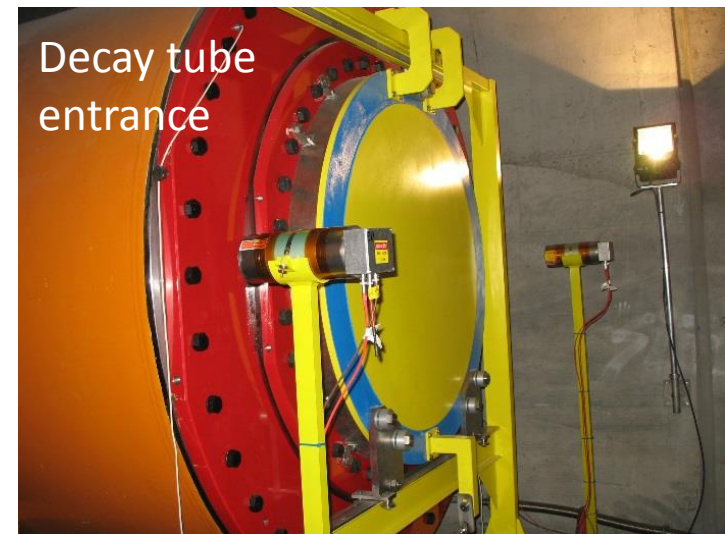
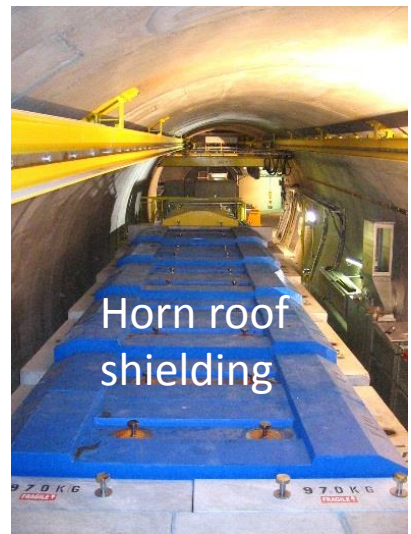
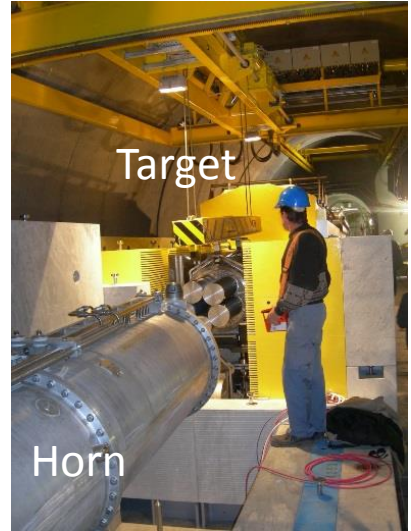
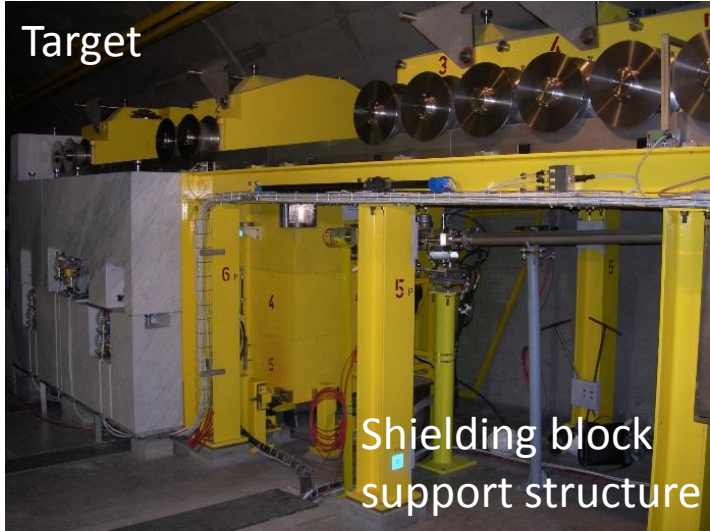








# TCC4 cavern since 2006

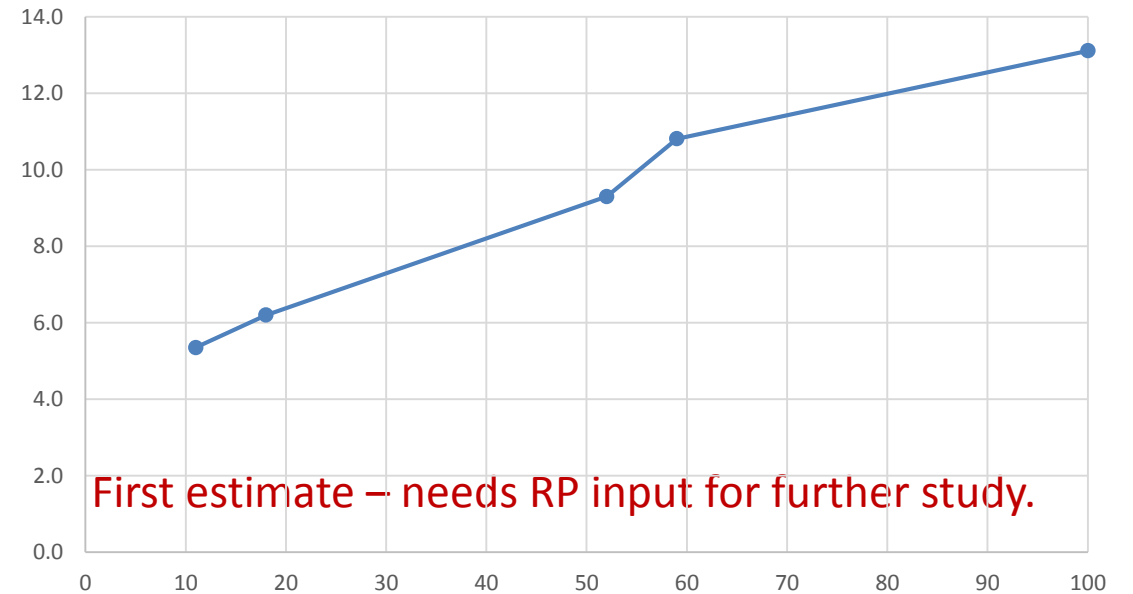




# Dismantling CNGS

prepare area (dismantle TCC4 upstream)
dismantle target, TBID and target shielding
dismantle target-horn interface
dismantle horn plus shielding
dismantle horn collimator plus helium tank shield
dismantle helium tank core
dismantle reflector plus shielding
dismantle helium tank2 shielding
dismantle helium tank2 core+CNGS collimator
dismantle end of tunnel/tsg47 shielding
empty area up to hetank1
empty rest of area
decontaminate up to hetank1
decontaminate rest
reinstall area TCC4 upstream

time needed [months] vs length gained [meter]



- A first time estimate shows ~14 months are needed to empty and decontaminate the entire CNGS area, at a cost of ~1.5MCHF
- Additionally, the area needs to have new general services (light, electricity, network, ventilation...) before any experiment can be installed. Estimate = 4 months, 0.5MCHF

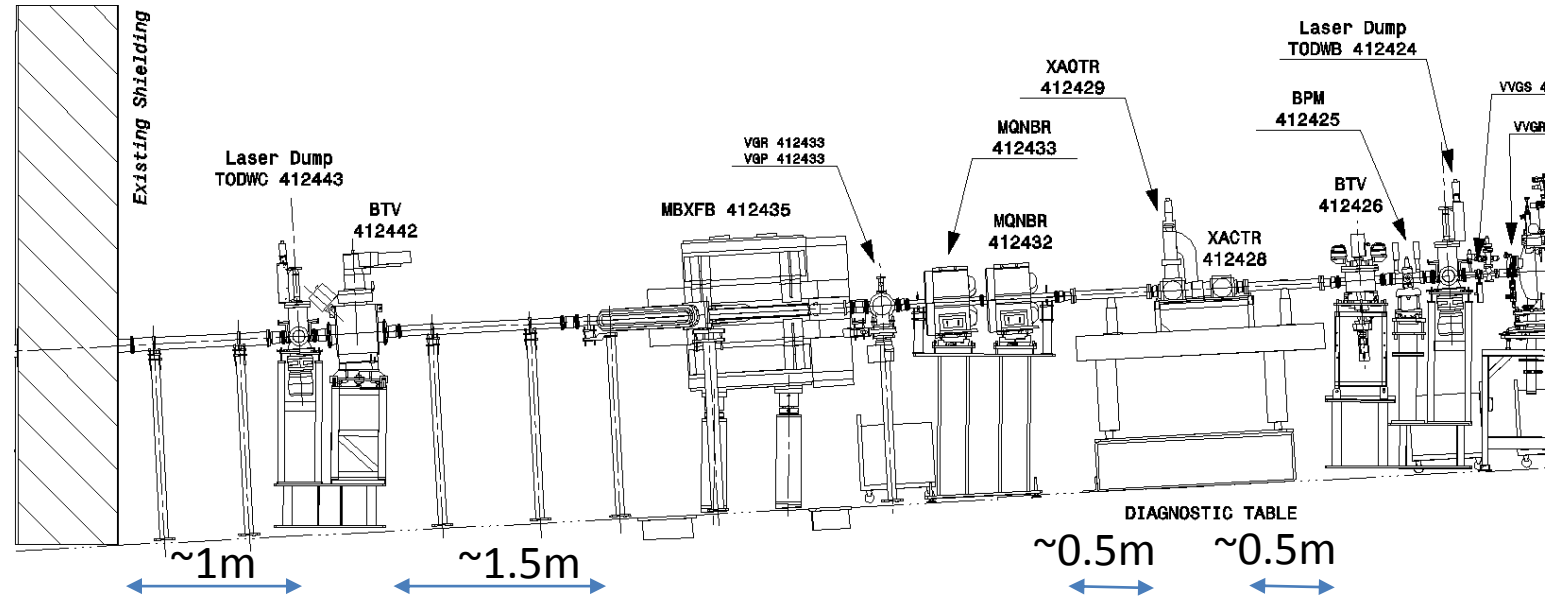




# Alternatives to win a few meter?

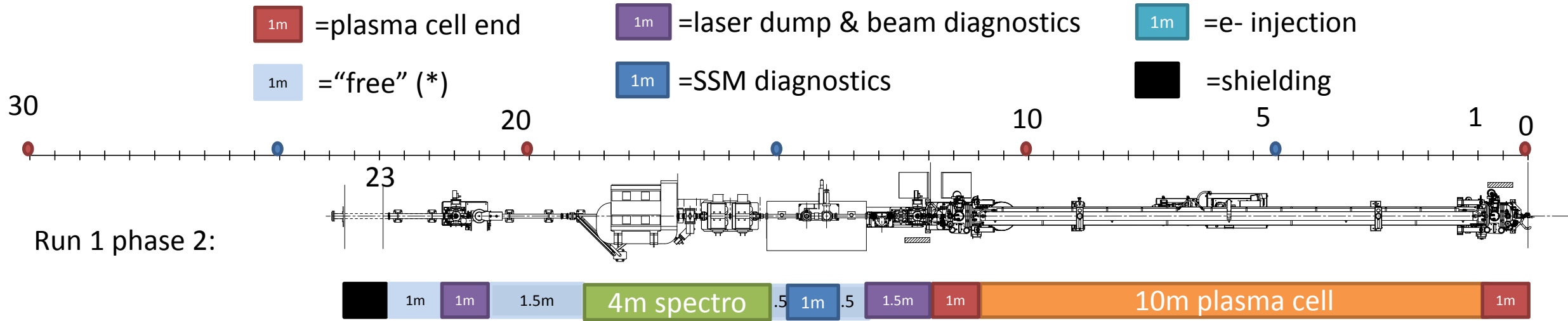
If we only take out the target roof shielding structure, there is no need to dismantle the AWAKE experimental area  
→ we gain 5 meters with ~ 2 months work.

If we reduce empty space in the current AWAKE experimental area  
→ we gain 3.5 meters with ~ 1 month work.



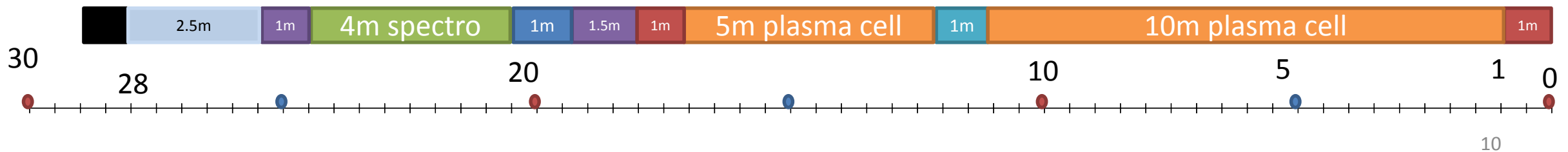


# Run 1 configurations → Run 2



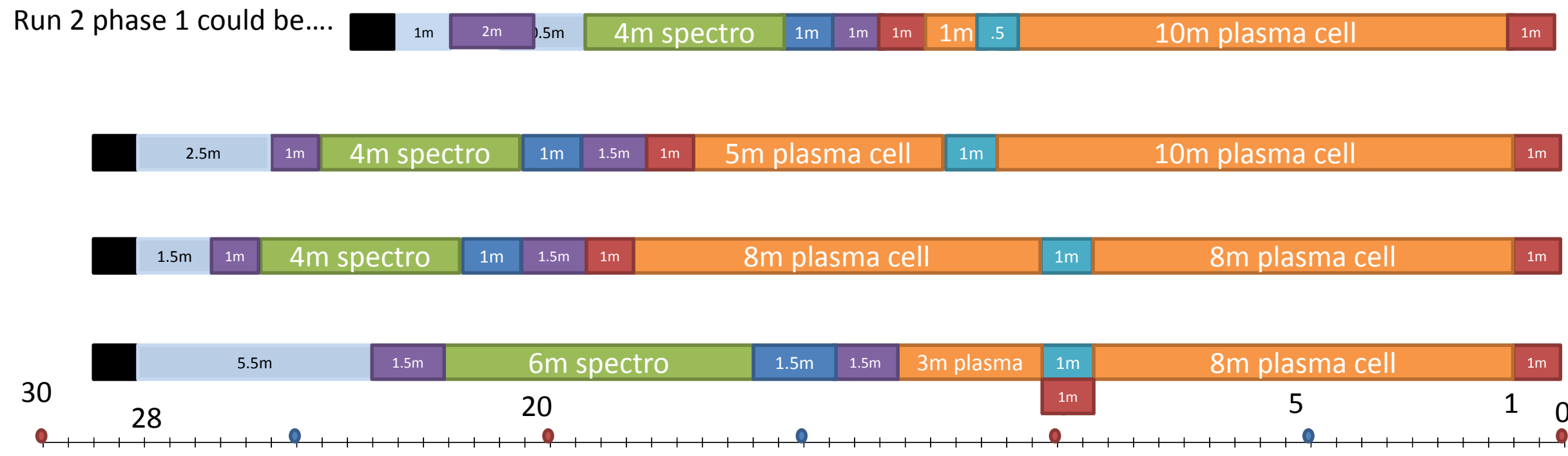
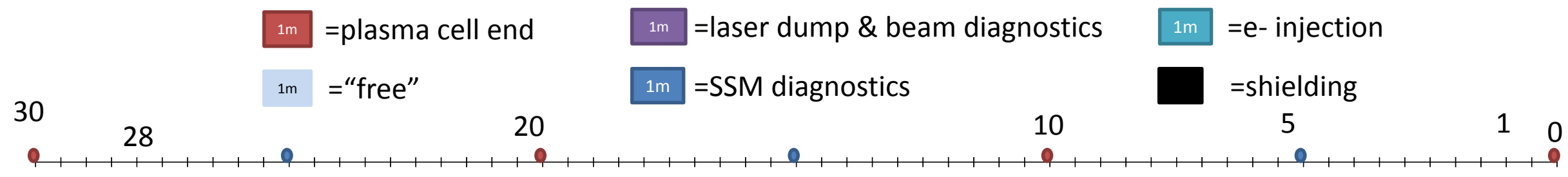
(\*) but do not forget about space needed for physics reasons or for new connections, bellows, diagnostics, services etc.

Run 2 phase 1 could be:





# Run 2 configurations







# Input needed

To estimate cost & time, we must have a first idea of

- How much additional length/space is needed
- Which services are needed & where  
(e.g. heat load, cooling needs, power, compressed air, gas, Ethernet, etc.)

We'll assume "same as for run 1" for

- Weight of objects + lifting/transport constraints
- Limits on humidity, temperature, dose rate
- Access needs (frequency, nr of people)

To start "full" CNGS dismantling studies, we must have CERN-RP input  
(dose rates of objects to define shielded containers and transport means)