Summary of the meeting with Ralf Trant (link-man for cryogenics matters on LHC cavities).

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Presents: R. Trant, O. Aberle, R. Losito.

- Ralf confirmed that for the cavities <u>mechanical interface</u> to the Cryogenic Distribution Line (QRL) we could use the LEP design for Helium inlet and outlet on the module. They will adapt their transfer line to fit in. On our side we have to check that with the present length for inlet and outlet it will be easy to mount and de-mount the lines (to avoid excessive stress on the transfer lines, which are flexible but only up to a certain extent.
- <u>Security valves</u>: Roberto stated that SL/CT couldn't define the type of the security valve and of the rupture disk. Ralf will try to tell us if a standard for LHC already exists or will be established. For the moment SL/CT will continue using LEP standard, and since this components are external to the cryostat they can be changed afterwards, if the LHC project requires a different type.
- <u>"Cones"</u>: we need to calculate the power dissipated by the beam on the tapered beam tube at the ends of the module. We need to define as well how much of this power we want to exchange with the He gas. After that they can help us in the calculation of the diameter of the tube to be used to extract this power (at the moment we installed a 6/8 mm tube like in LEP) and the heater power needed to warm up this gas to 300K.
- <u>Temperature control</u>: it was a common point of view that cavities have different needs than magnets. For the time being the temperature probes (hardware and application) are like for LEP and therefore not as the LHC standard. Ralf will discuss that point within ACR as well as directly with Ed Ciapala. Furthermore he pointed out, that an "Instrumentation Working Group" for LHC is running since quite a while.
- <u>Pressure control</u>: This is much more critical for the operation from the RF point of view. Ralf will try to clarify which ACR section will be responsible for the cryo operation of the modules. He pointed out that most probably digital positioners will be used for LHC cryogenic control valves inside the QRL. Therefore he proposed to take this elements already now for the test if possible. This would allow to check the performance before the installation. According to Roberto this could be done during next year provided that we define
 - 1. The pressure of operation

2. The acceptable range of pressure (ex 1280mbar \pm 10 mbar)

At the moment in LEP this range is ± 15 mbar (in principle). Depending on the limitations responsible for the ± 15 mbar, something better could possibly be realized with the digitally controlled valves.

<u>Measurement of Q in the tunnel:</u> Most probably a cryogenic mass-flowmeter will be installed inside the QRL at every outlet to a cryogenic "client". This will give the overall He consumption of one cavity module. This could give us the possibility to "measure" the Q of the cavities in the tunnel. This procedure could be tested at SM18 next year (how to measure at SM18 the consumption?).

• <u>Warm-up</u>: Presently the warm-up takes 4/5 days. This is comparable with magnets so in principle we don't need to put additional heaters to speed up the process; to be confirmed.