Presents:

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Sergio welcomes. Minutes from kick-off? No comment.

Agreement signature, not yet completed. From Rome to STFC, got lost. CERN administration asks infn to produce a copy and send it to STFC. DHL fast track receipt is available, so somewhere in stfc admin. Let's leave it in their hands.

Erk asks which action? Ivo Lobmeier deals with it. Post-meeting information (23.9): the agreement is in INFN-Headquarters hands being signed, will be sent back directly to CERN

Sergio asks Enzo about start even without agreement officially signed? Enzo confirms he has started already, looking into spinning and 6GHz. No hiring however before signature. Also at cern work has started already.

Actions identified last time:

CERN

Launch contract for delivery of copper OFE; done (framework contract). Supply OFE 2-3mm sheet copper to Legnaro for 6GHz? No specification from Legnaro, so no delivery yet. But sheet of 2mm and 3mm. 2 sheets 2mm, 1sheet 3mm, 1000x1000, each. Annealing at 245 C / 2h will be needed , precise values confirmed by Said, will be done at CERN

Produce the drawings for 800MHz cavities. Federico reports: mechanical analysis, RF volume given, spec was to avoid stiffeners, so play with thickness. Calculation against buckling. 3mm are ok. Other 2 phenomena: external pressure during testing, so thicker, but tuning and manufacturing goes for thin cavities. He knows that feedback recovers 100Hz. With 5mm we are in same range as 3mm with stiffeners. Enzo replies that with present machines, 5mm final thickness impossible. Following strategy proposed and supported by Enzo: cut the work in 2 steps. 1) concentrate on production of structure with only buckling in mind, 2-3mm, if necessary with stiffeners 2) then go up to higher thickness once lessons learned and if necessary.

Walter: we can lock cavities with a good loop and follow the frequency shift, we are used to that. We don't need to bother with the frequency shifting due to pressure oscillations. LEP cavities were 3mm. Enzo explains that he would start with 4-5mm and reduce later.

Enzo explains: Go to lower frequencies, larger equators, enhances the problem of scratching during spinning. Rollers mix the scratch and you lose the memory on small diameters. On large diameters, the scratch propagates and becomes a fracture, which can even cross the thickness. Of course, the best is not to have initial scratch, but even asking for a perfect sheet, you get scratches in the delivered sheet.

Enzo tries to produce artificial crack and looks into how the scratch propagates during spinning, with forces, rollers, velocities. He could start with 5mm and go down to 3mm with 2mm minimum. Maybe start from tube. Said asks whether the machine has force control feedback on rollers. Enzo:

yes, one, but smaller diameters, on large diameters he has not but he works with 2 rollers. But force control is ok for production and not for development, where it's not so important.

Said: thickness goes also with welding beam-pipes where low thickness is suitable. But we can remachine locally for welding of beam pipes. He wants a smaller thickness at the welds.

So we go for 3mm thickness on drawings.

Work-out a plan of production and testing followup. 1) followup from CERN and 2) testing program as action for Legnaro. Type of analysis we want to do, what we have, sc properties, etc.

Alban will send out the list we have set up, for brainstorming, then everybody may highlight priorities and possibilities. We may start discussing it here, as we can now easily chat on this. Enzo suggests: check if film is ok. Once sufficient quality, the problem is the interface. He proposes focus on the interface. With, without buffer layer, different temperatures, different techniques. He expects Reza and Oleg to propose which is the best characterization. Reza points to the fact that substrate preparation is checked, kept constant, then test a technique to quantify the surface quality. Enzo claims we don't have means to make this better than now, just the adherence seems to him the most important parameter, therefore the interface. Reza explains we can look at interface with many techniques: composition, chemistry, morphology. But the change of chemistry occurs when? We don't know. We need to go back to tracing, to know what.

Enzo insists to focalize on the hammering of Nb inside the surface. Reza can you suggest a technique of analysis of the sole interface? Reza: microscopy, FIB, then electron diffraction (LEED), change in the crystalline structure due to impurities, trace impurities (N, O), SIMS, then take into account which is the origin of what you are seeing by good tracking. Sergio insists on performing the analysis in always the same way, not just procedure of production.
Enzo thinks of Nb clad copper, with explosion. Reza: then we compare one which is very good and see how far we are with the other technique. Sergio contests the idea of clad copper, it's one dimensional heat transfer, while in clad you have also transverse heat transfer. Also gradient deposition with intermixing was one of the things to try. Buffer layer, when, before, after, with exposure to aire, etc.

Tracking proposal by GV, going with Enzo production sequence and Reza's testing proposals going with these.

Enzo asks whether we can start with flat samples, much faster, much more samples. Then repeat on 6GHz cavities. Only characterization analysis on these flat samples. Then we would go for 6GHz cavities. Erk asks if the deposition method is the same: reza and Enzo confirm. You can be sure that all samples are treated in the same way, so more reproducible. Reza: where the 2 techniques are applied, the procedure must be absolutely the same, e.g. the people doing flat samples are the same as doing the cavities.

Sharepoint will be prepared.

Another meeting with Alban, Reza, Enzo and me. After the ½ poster session.

Said: sheets half hardened, heat treatment? Difficulties in avoiding cracks unless 40-50GHz, annealed state. He needs 250C, 2h, just relaxation. Said limits at 245C just for relaxation; above 250, you start loosing mechanical caracteristics.

What does Daresbury want as deliverables for the deposit system. If reza could send it already today, to have a chat together while still here. Note: text in Annex to these minutes, see below

Actions:

ALL: first brainstorming on the tables of sample testing & analyses provided by Alban, here in Whistler (minutes in annex)

Enzo: confirm in e-mail request for number, size, thickness heat treatment of Cu-OFE sheets, end of September

CERN: supply sheets according to request, end of October

CERN: forward fabrication drawings of 800 MHz cavities, end of October.

Annex (STFC, Reza Valizadeh)

STFC has already invested a significant amount of capital at Daresbury Laboratory to develop the manufacturing and assembly capabilities for SRF accelerator technology such as ISO3 and ISO4 Cleanrooms, 1350 psi high pressure ultra-pure water supply which has a rinse nozzle wand capable of operating up to 2 RPM, a full sized walk-in laminar flow buffer chemical polishing facility (BCP) and a single vertical test facility (VTF) which has been used for qualifying 1.3 GHz structures. As part of this collaboration STFC/ASTeC is planning to add superconducting thin film deposition of 6 GHz and 1.3GHz technology to the existing infrastructure mentioned above. For this STFC seeks to set up a 3D deposition infrastructure at Darsebury laboratory based on the experience and knowledge of CERN and INFLN and to be able to test and validate the SRF performance of the cavity after deposition. The design of the infrastructure can start at beginning of 2016 and first 6 GHz cavity coating by the year end of the 2016.