



This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 730871.



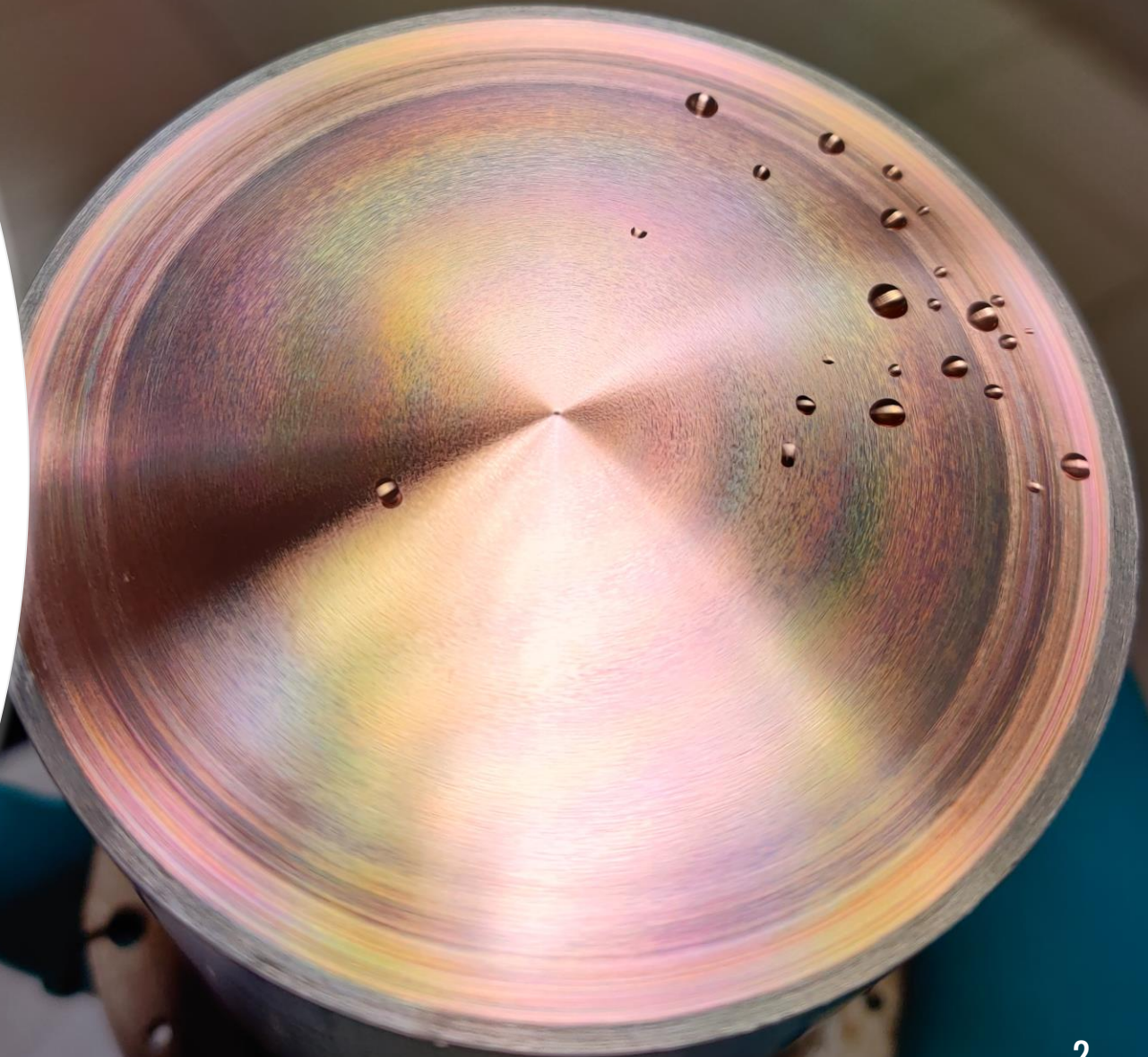
**Eduard Chyhyrynets,
Vanessa Garcia,
Cristian Pira,
Fabrizio Stivanello.**

ARIES WP 15.2 progress

ARIES 16th WP15 meeting - December 3rd, 2020

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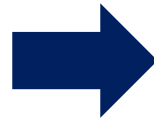
QPR activity



Last QPR prepared: B4



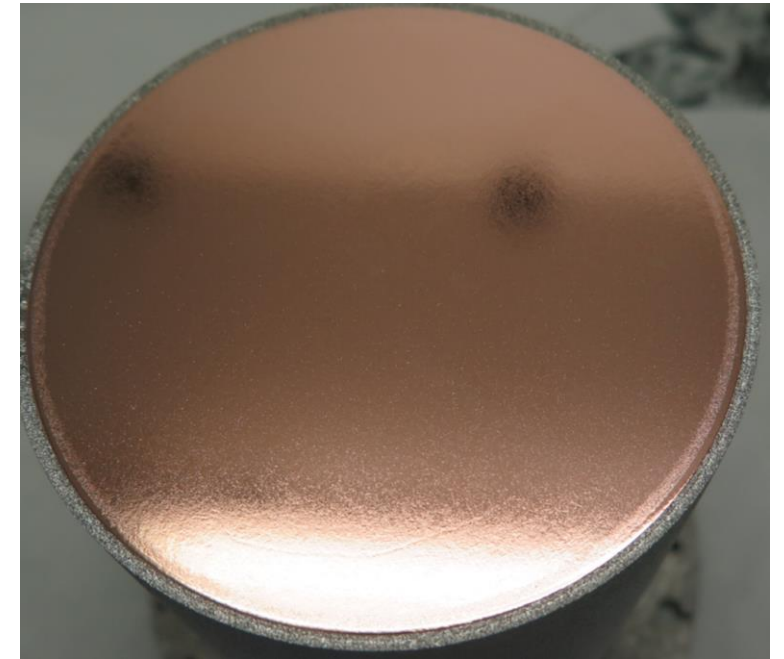
3 h
Stripping
08/09/2020



Longer stripping



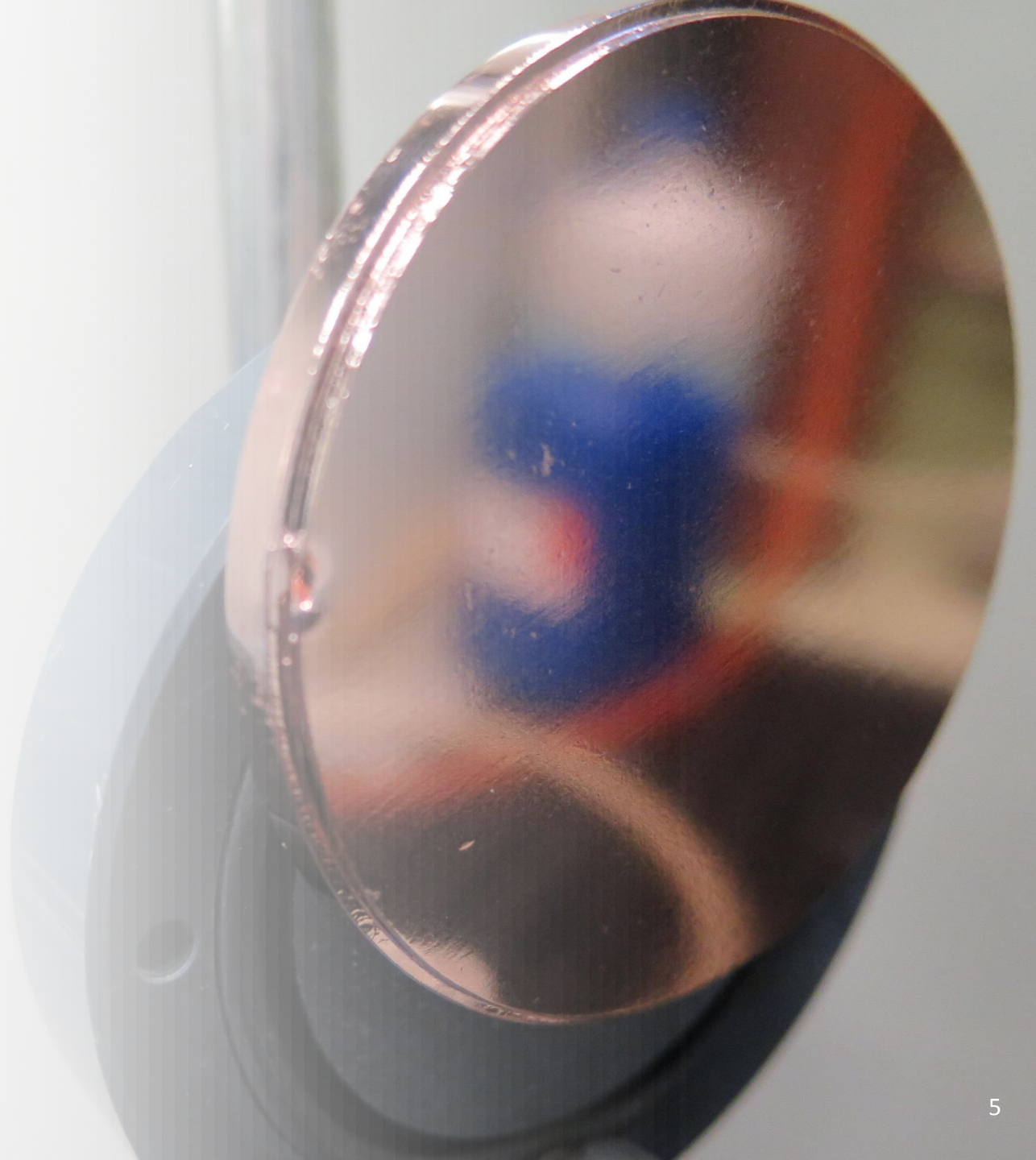
10 Min EP
10/09/2020



Sent to Siegen 12.10.2020

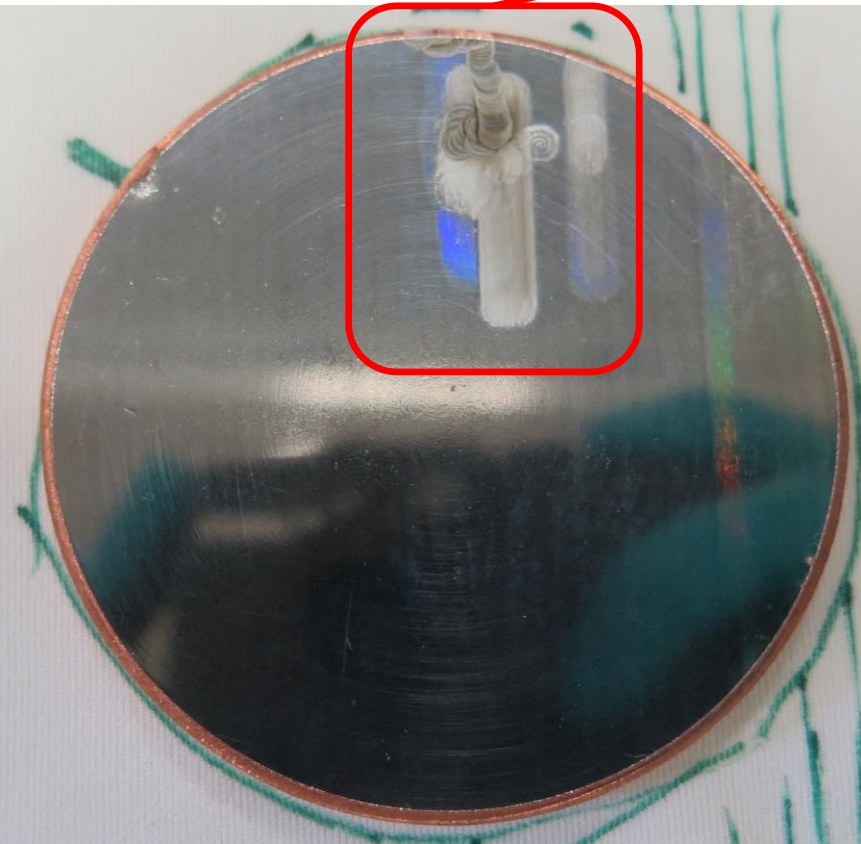
ARIES-QPR-HZB-B4 Files folder on cernbox

Small samples activity

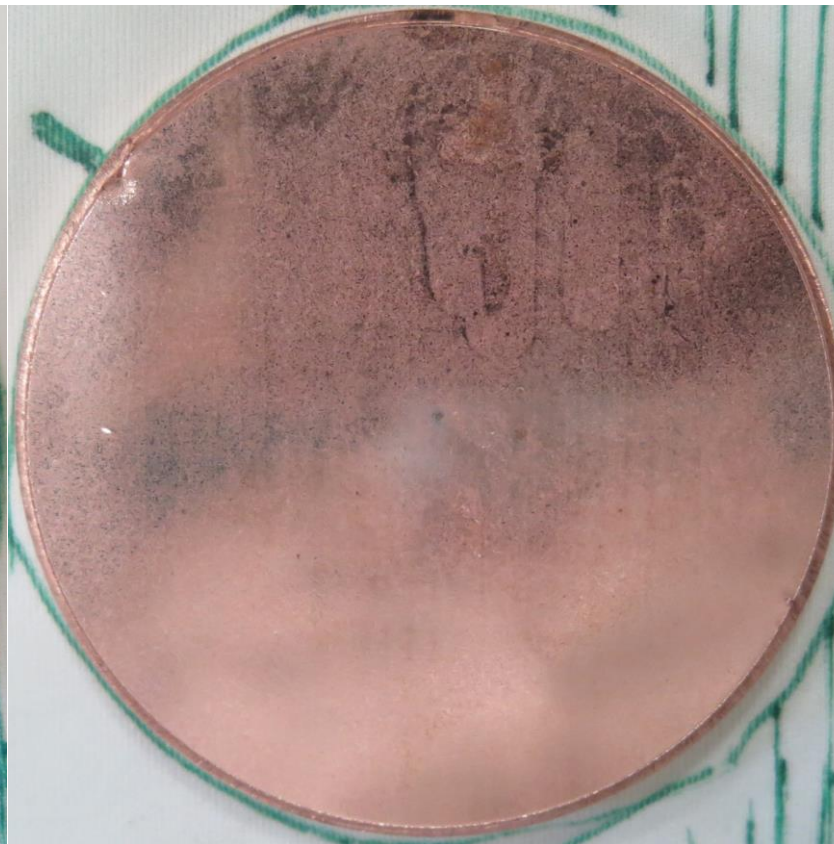


Cu disk from B1 QPR

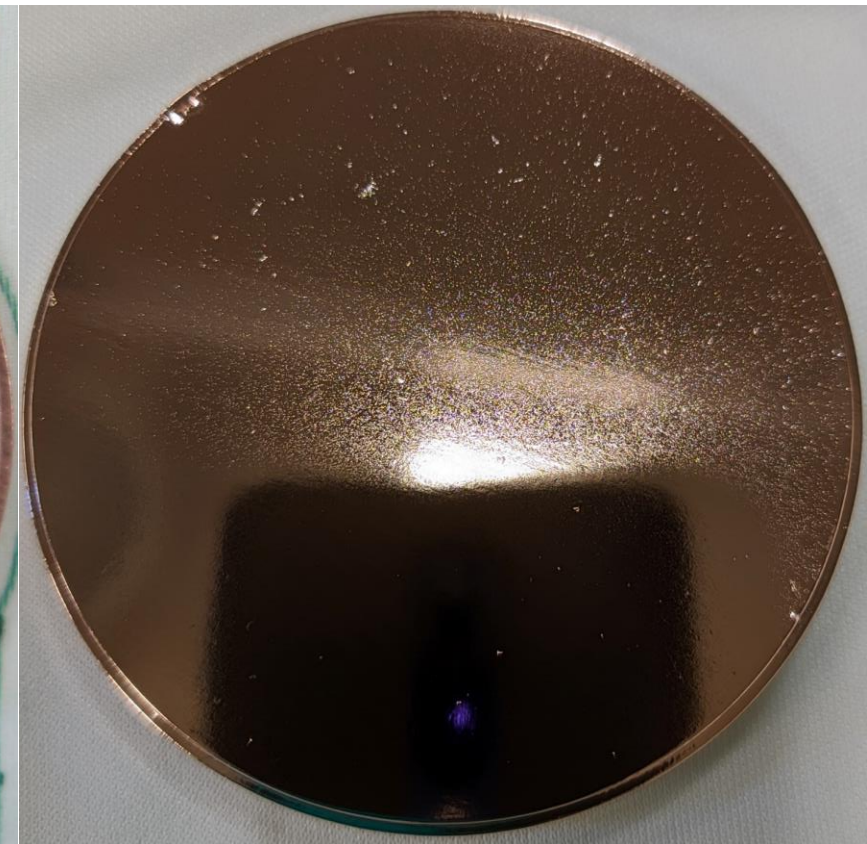
Laser polishing by RTU



Arrival Nb film on Cu disk



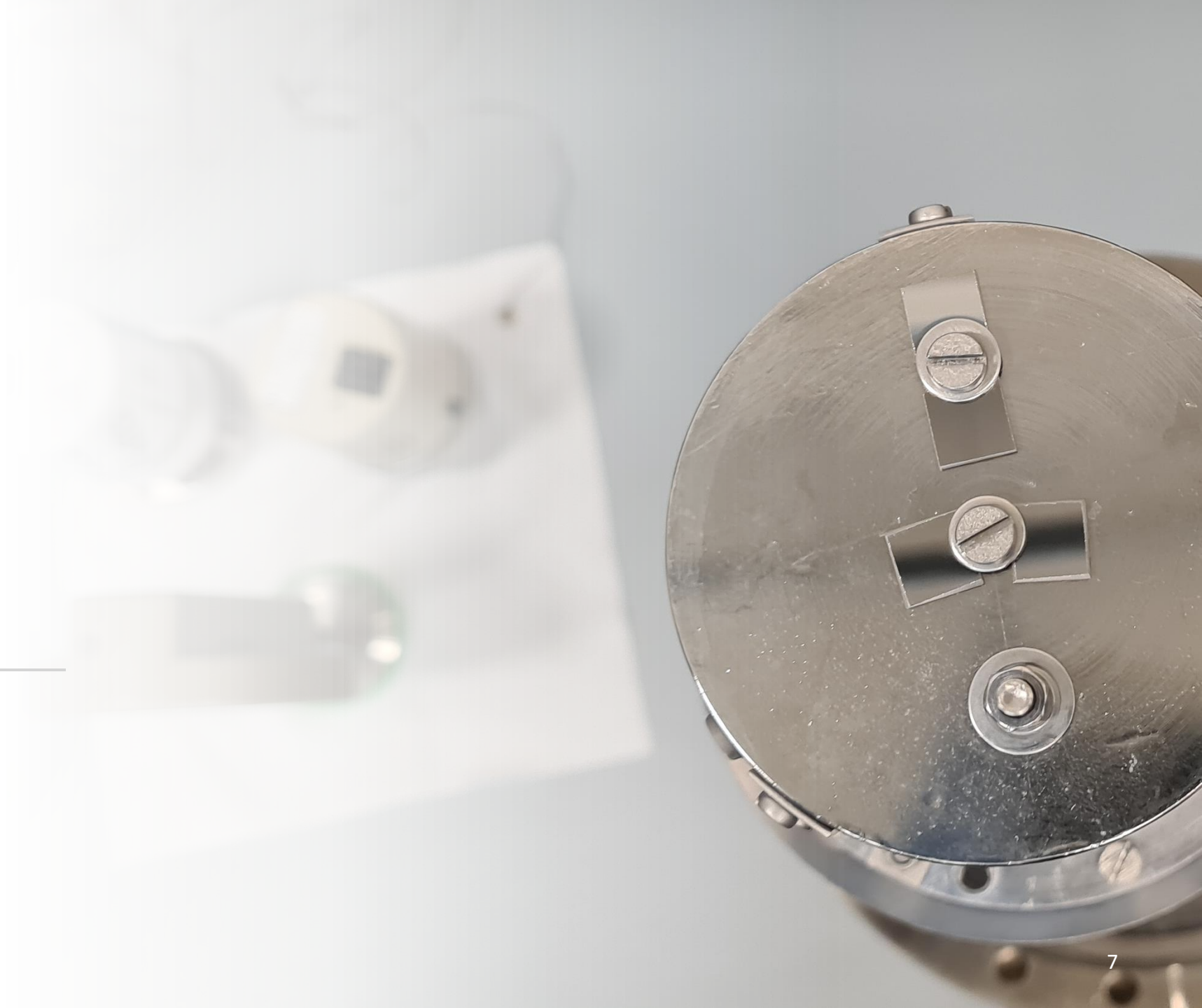
After 3h stripping



After 15 min of EP

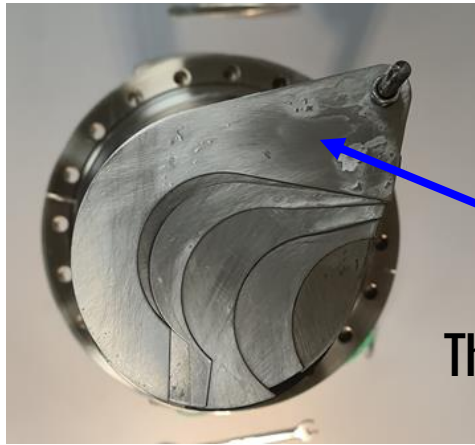
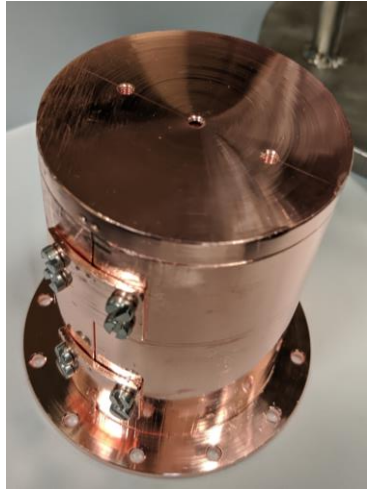
Sent to STFC 20/11/2020

Deposition activity



Sputtering system

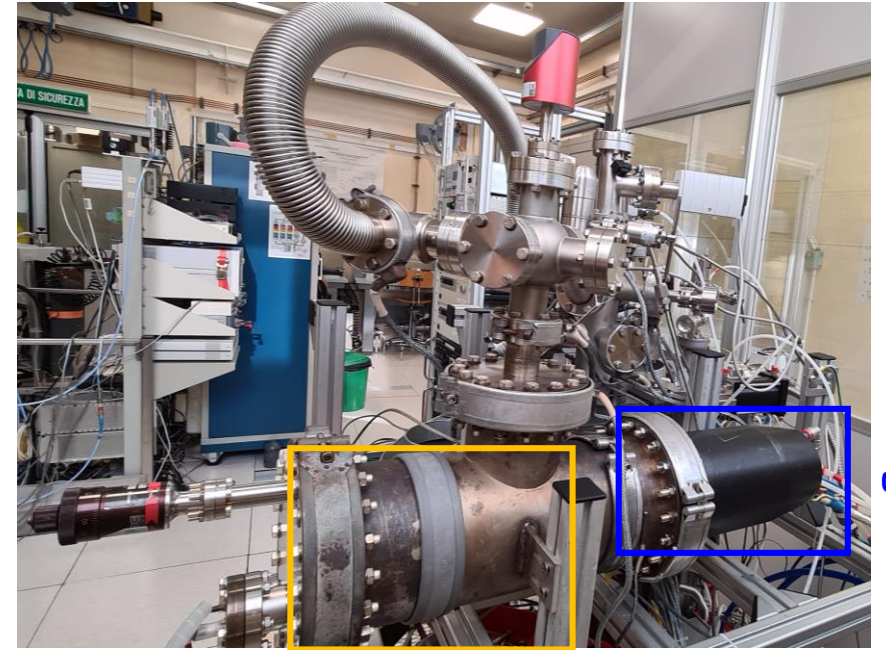
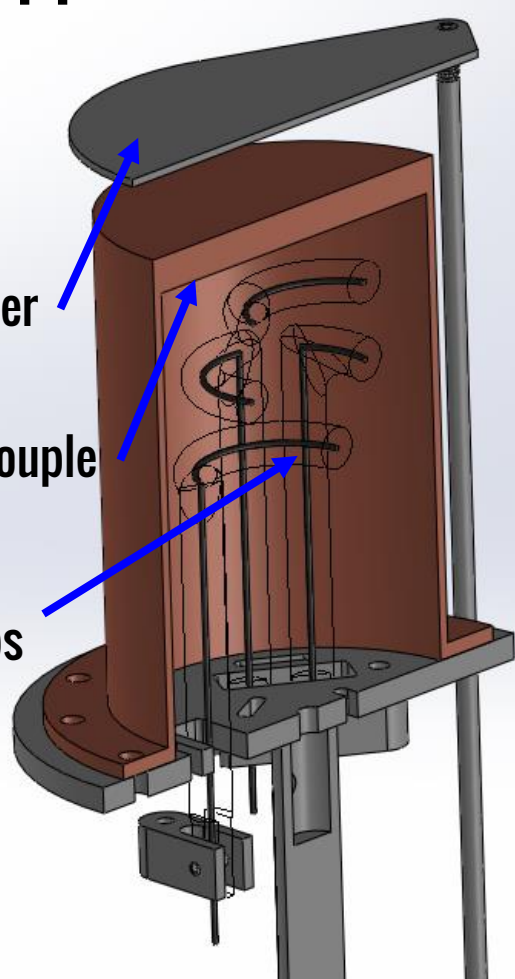
First test on quartz samples on Copper QPR



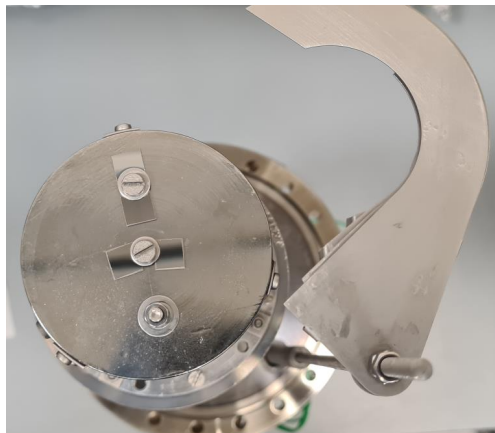
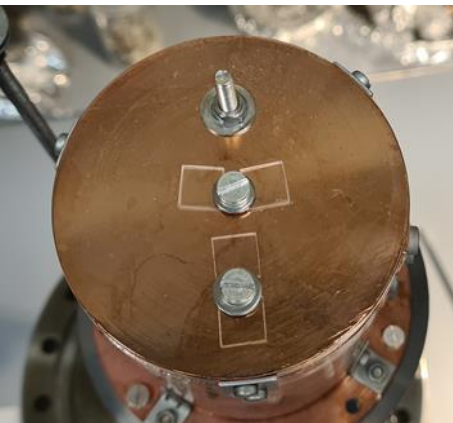
Shutter

Thermocouple

3 IR lamps



4" Magnetron



Plan

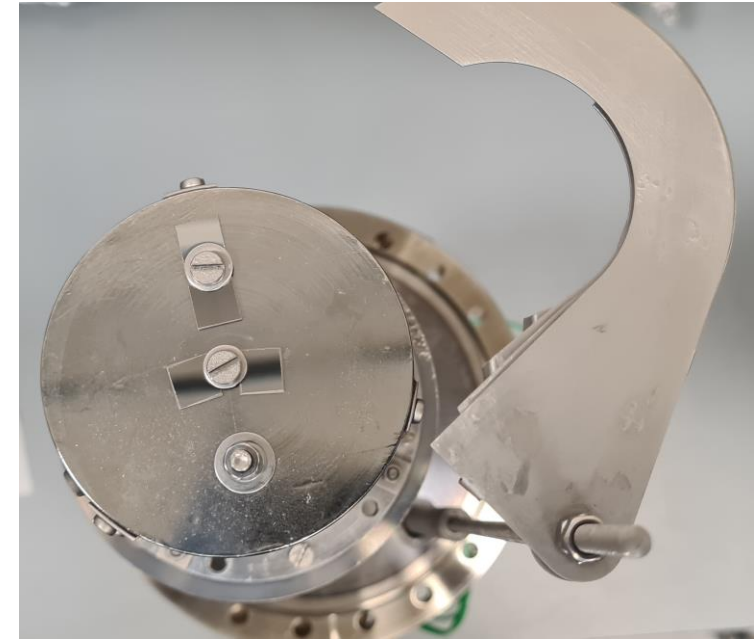
- Reproduce the Nb thick film deposition of Cu 6 GHz cavities on the QPR.
 - $T = 550^{\circ}\text{C}$
 - $P_{\text{Ar}} = 6\text{e-}3 \text{ mbar}$
 - $I_{\text{ion}} = 2.5 \text{ A}$
- No shadows

Thick films in
6 GHz configuration



Thick films in
QPR configuration

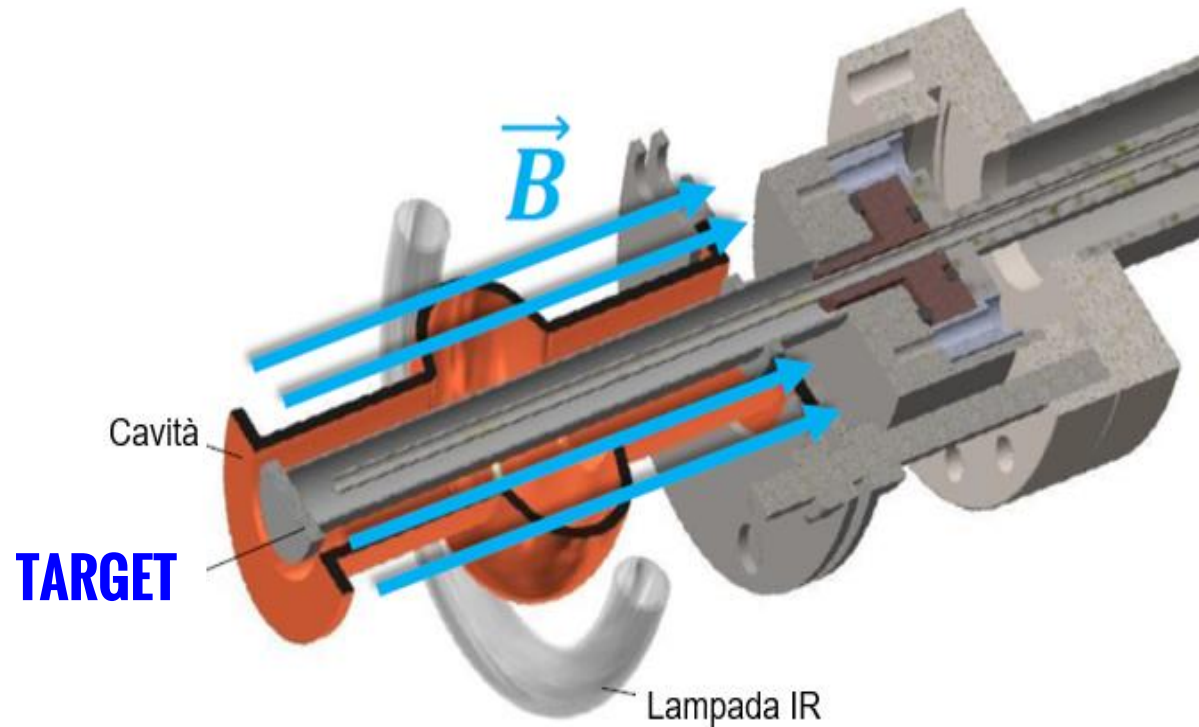
Second sputtering test will be of Nb thick film onto Cu samples to compare the microstructure with the 6 GHz cavity thick film with EBSD (STFC).



Ready and eager to
sputter next QPR

Nb₃Sn

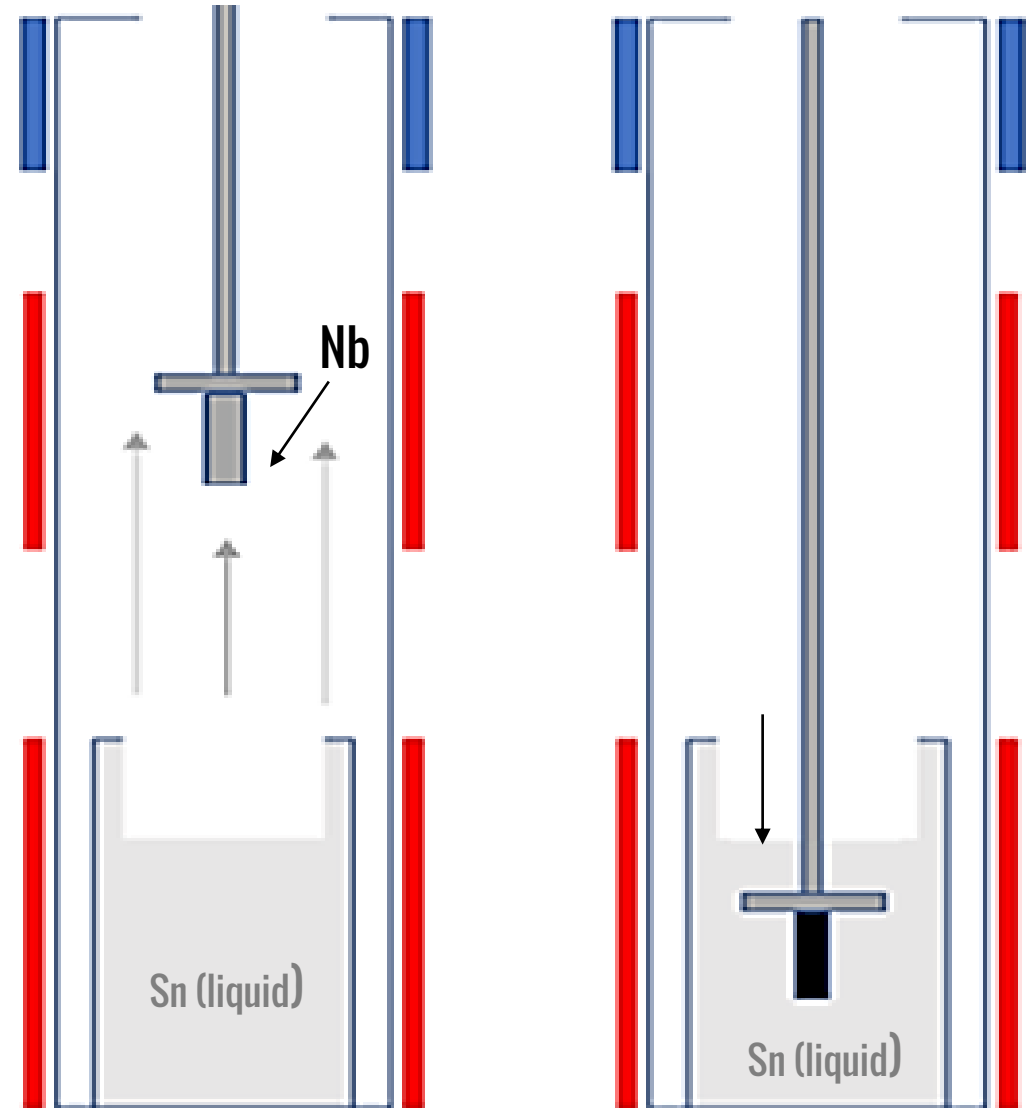
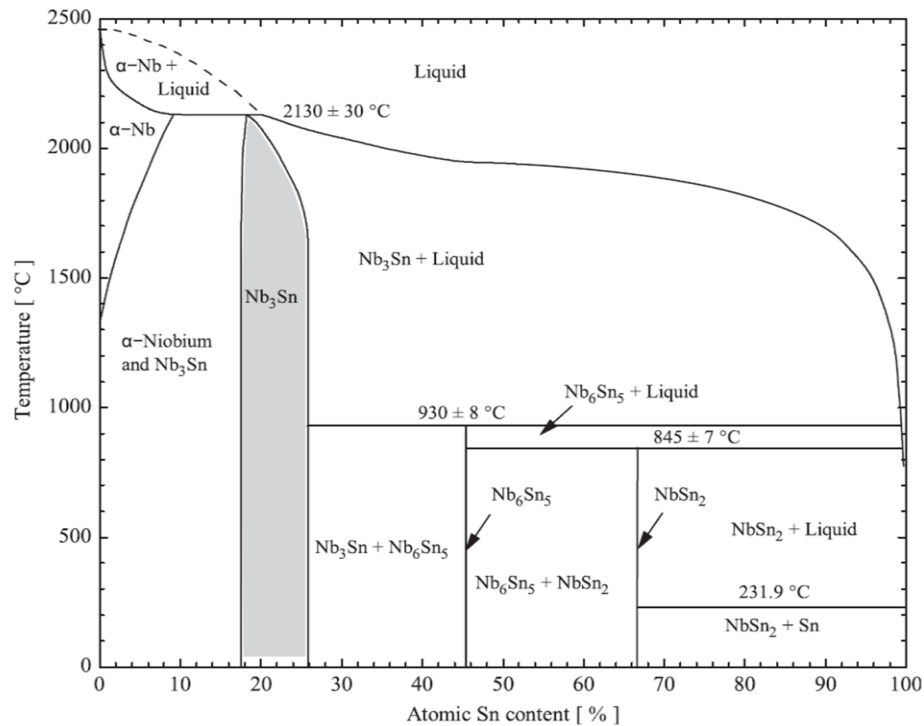
- Liquid Tin Diffusion to produce a Nb₃Sn target (I-FAST)



Nb → Nb₃Sn

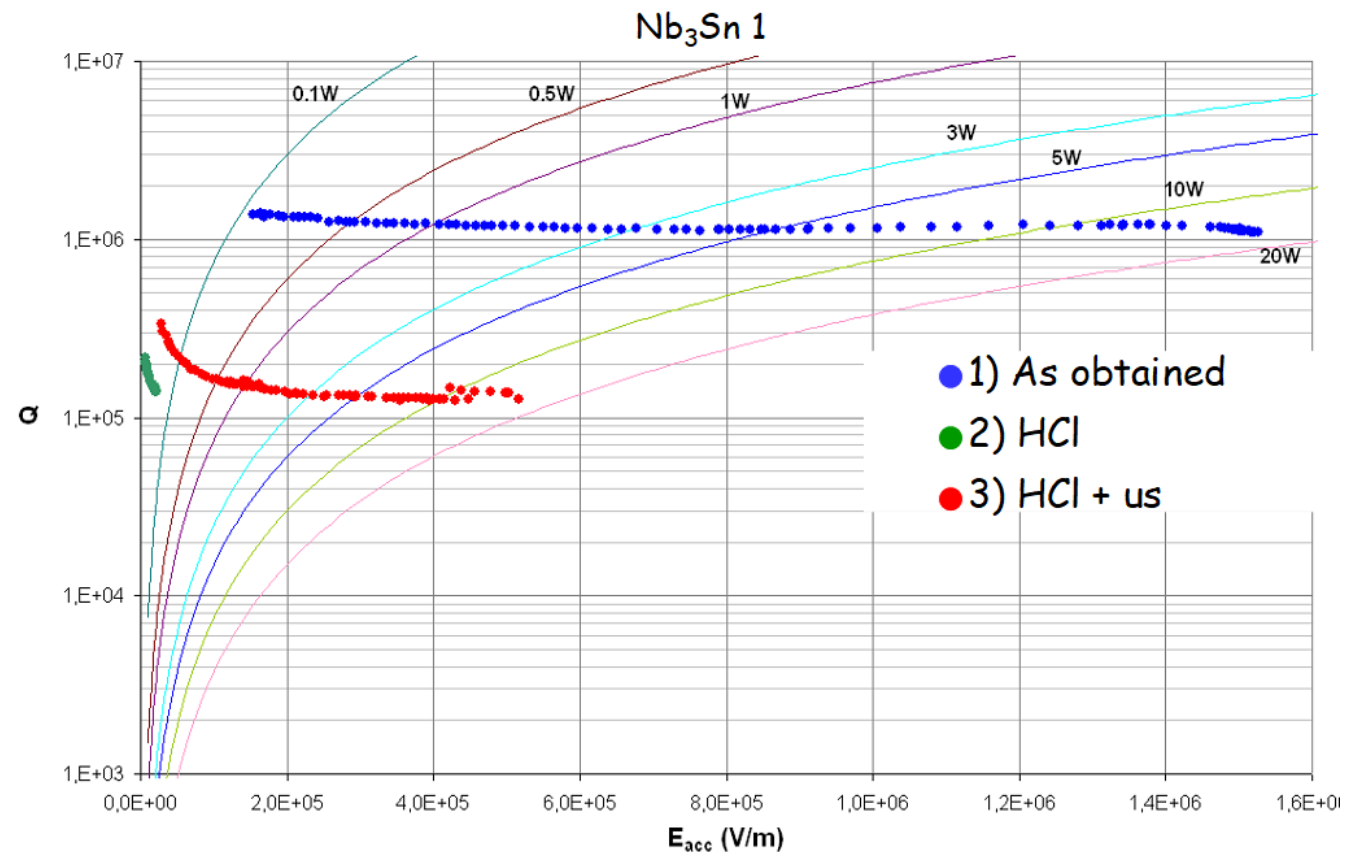
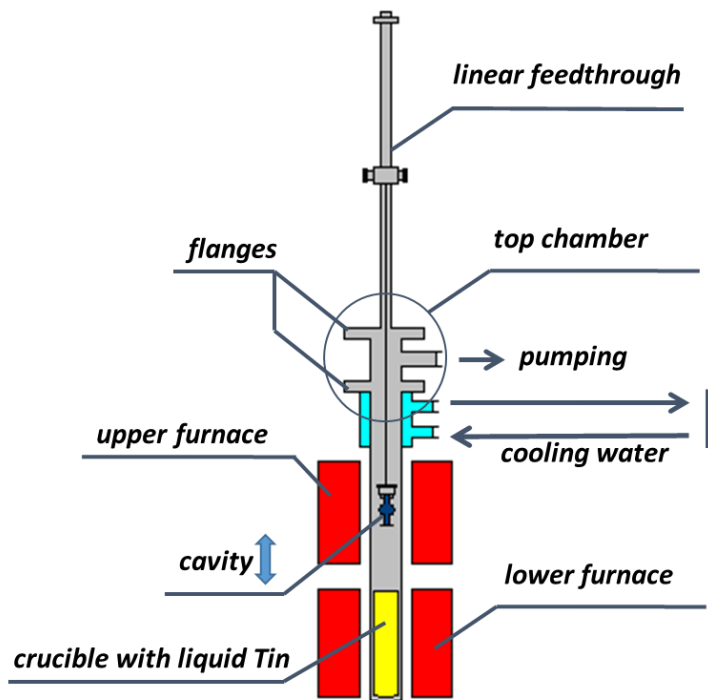
Liquid Tin Diffusion

- Simple process
- Used in Nb_3Sn wire production
- Already explored for SRF @LNL



Liquid Tin Diffusion

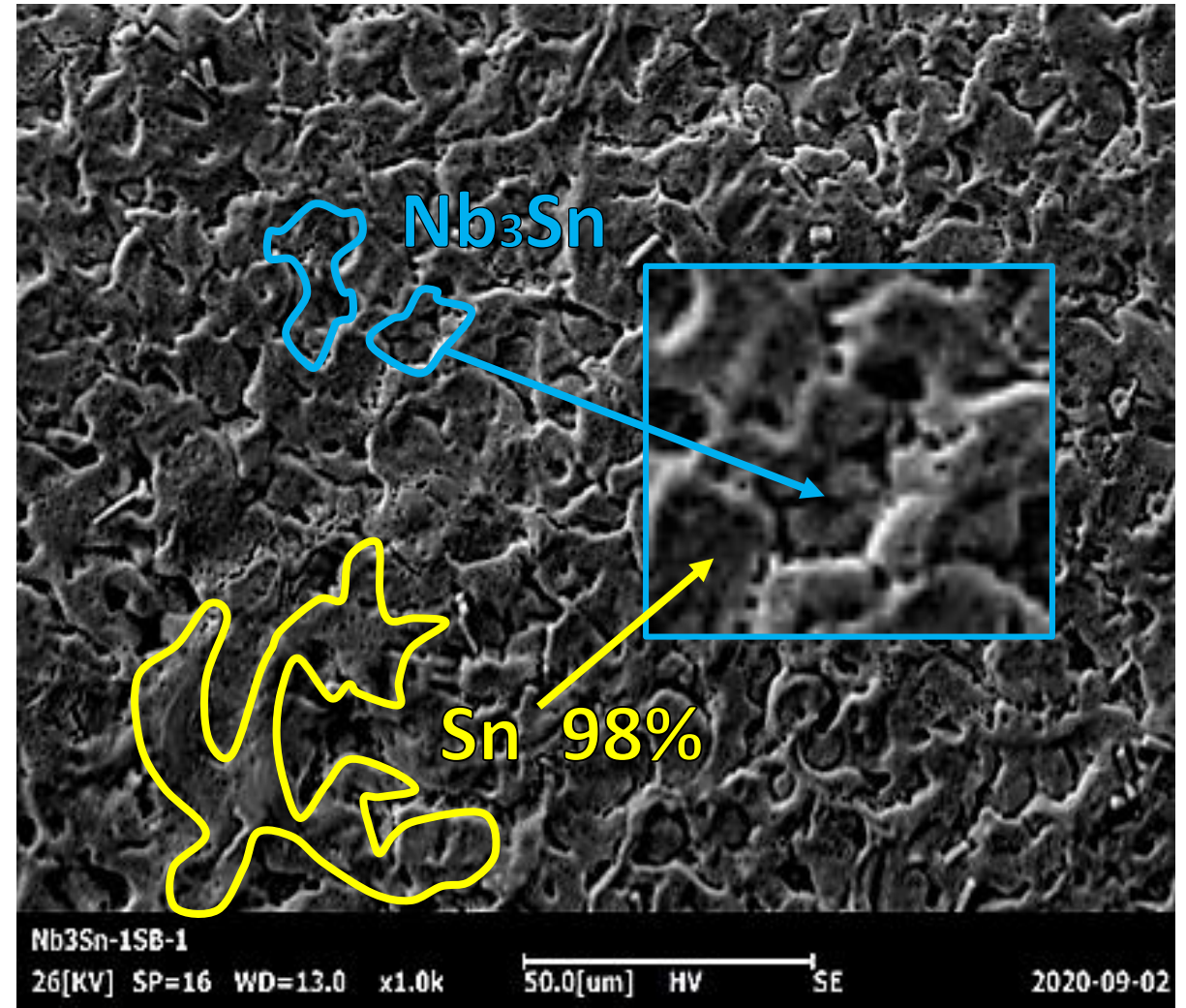
- Simple process
- Used in Nb_3Sn wire production
- Already explored for SRF @LNL



Poor performance for 6GHz cavity

Limitation motivation

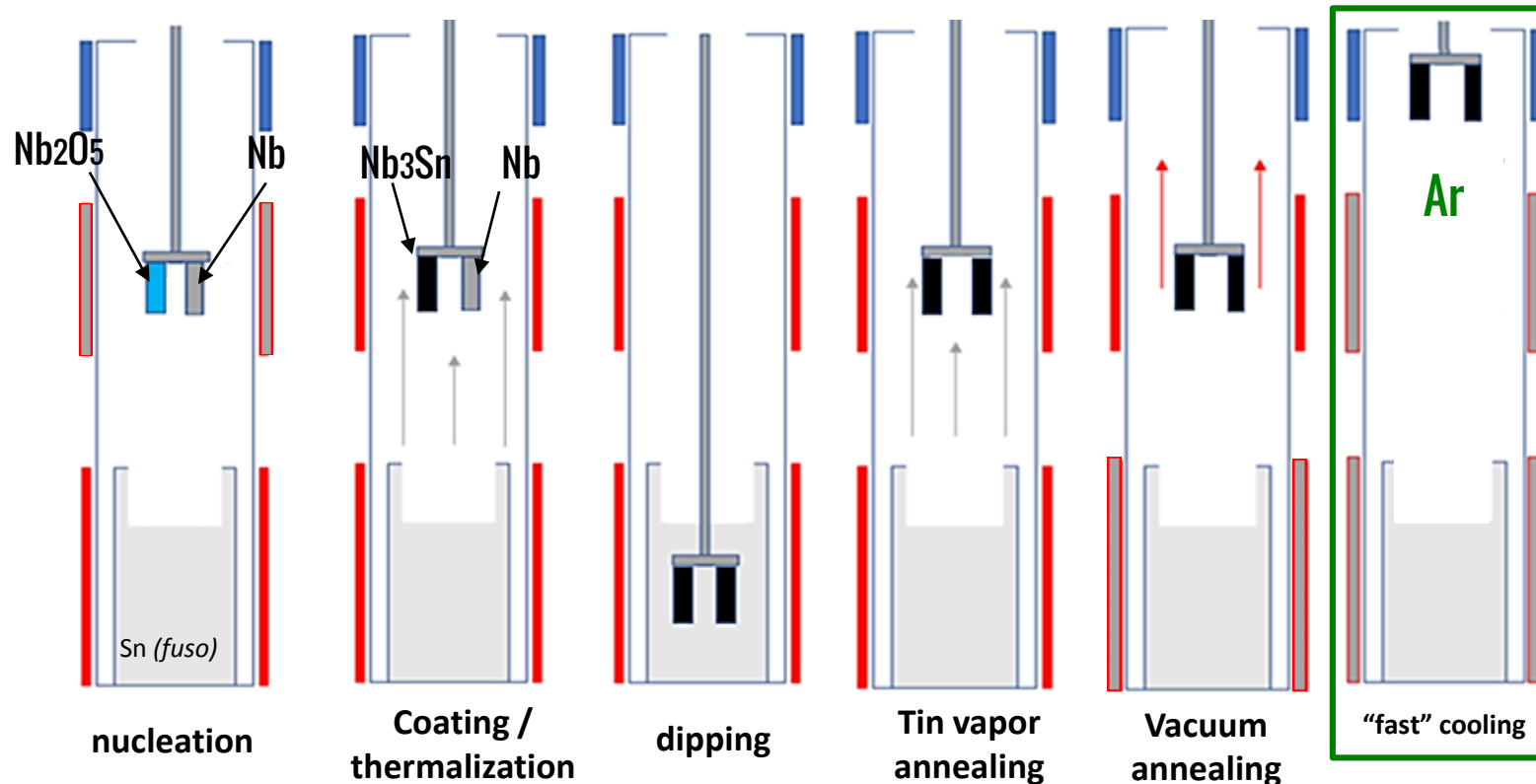
- Sn drops on the surface
(could be not a problem for a sputtering target)



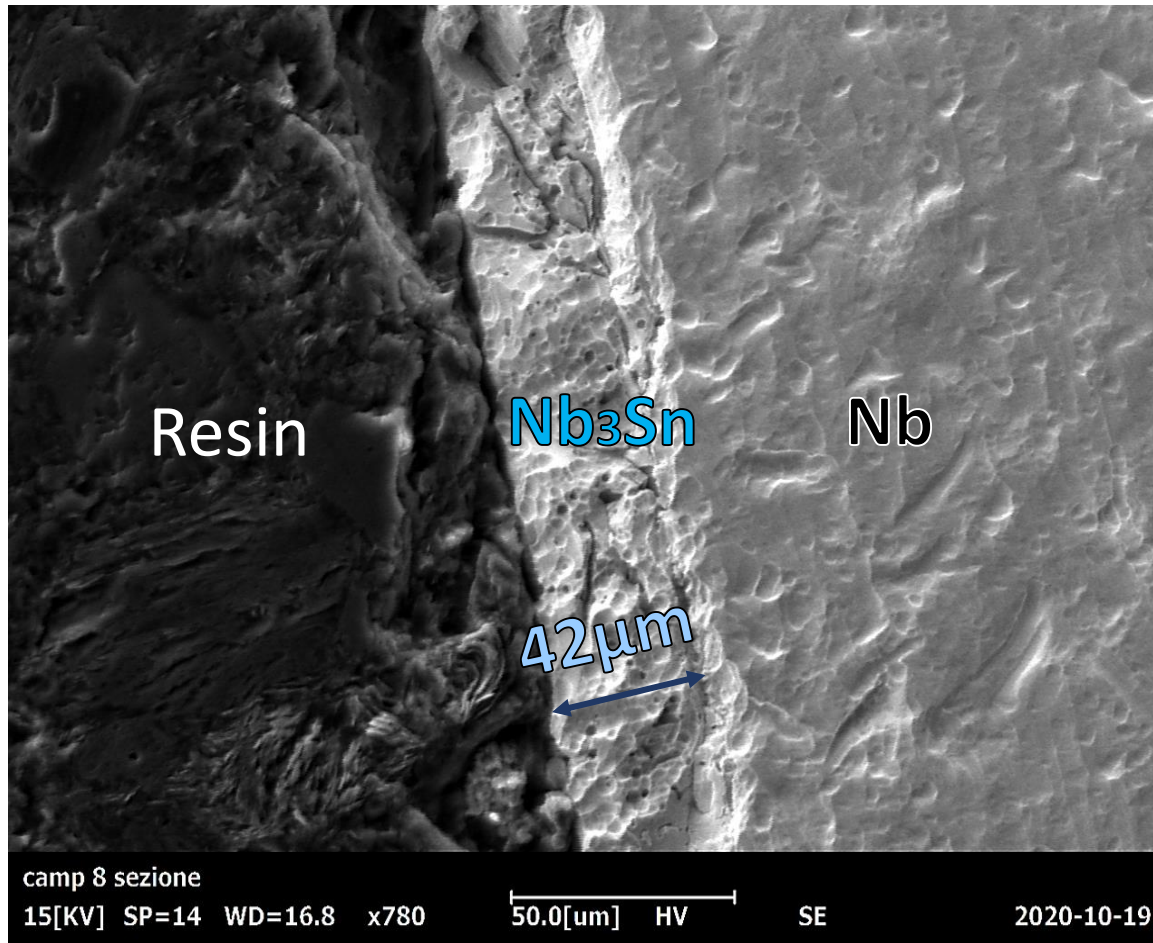
Surface SEM for standard process sample

New process

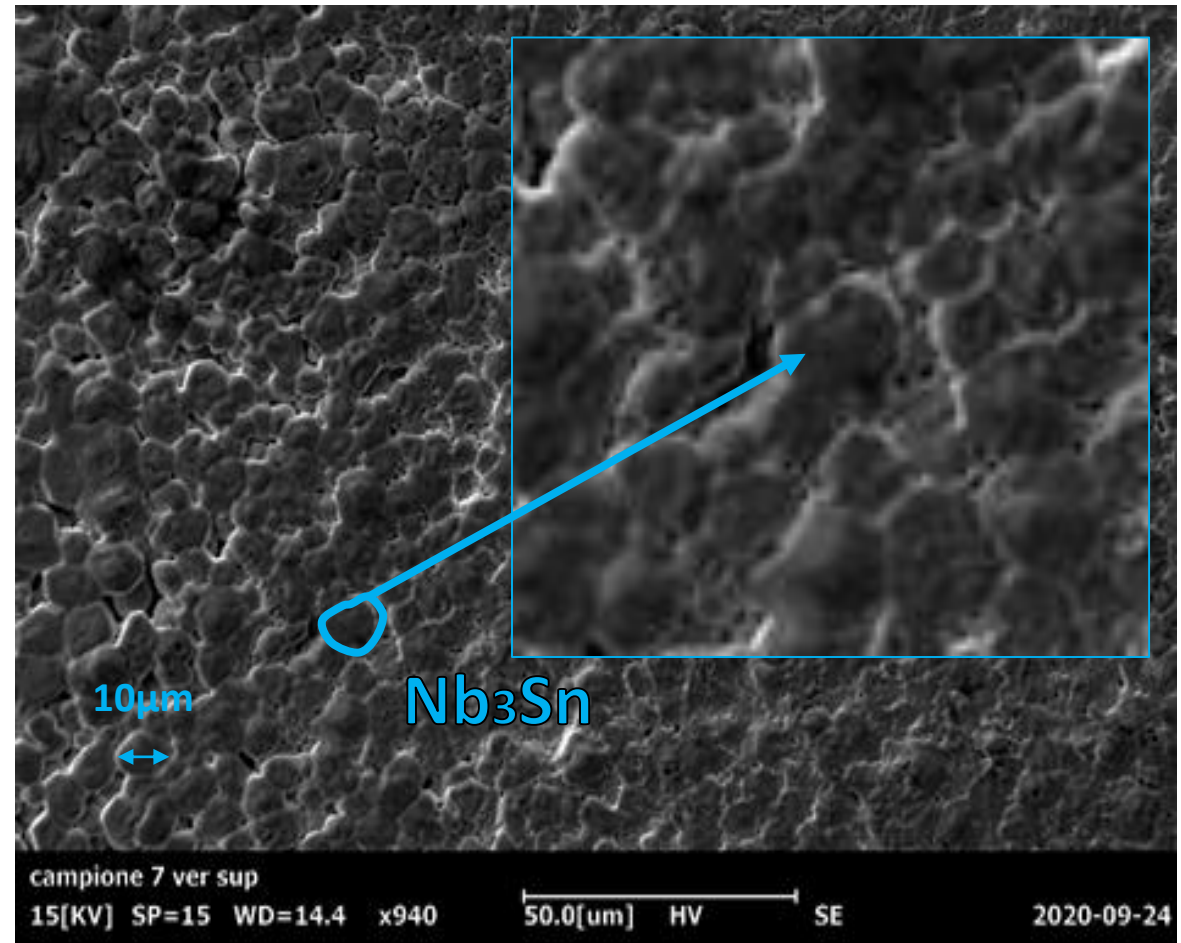
- Pre-anodization to enhance nucleation (adopting from vapor diffusion process)
- Two annealing steps
- No tin drops on the surface



Very promising results

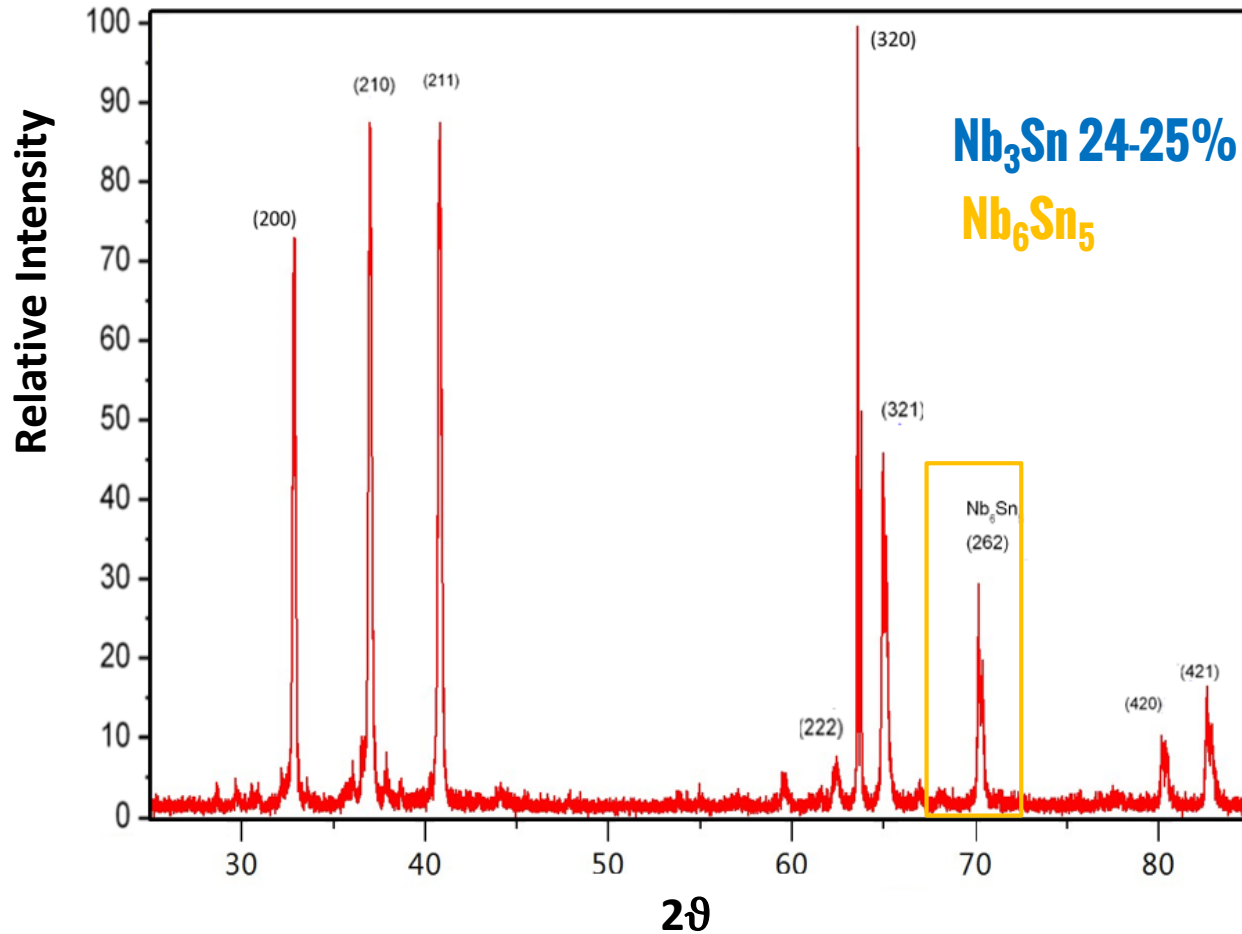


Cross Section



Surface

Very promising results



- No SC test yet
- LNL 4 probe T_c test is under repair
- Further characterization are necessary

XRD new process



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Questions and Answers

Thank you for your attention



<http://surfacetreatments.infn.it>



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