

Secondment M. Aicheler to Metso (Tampere)

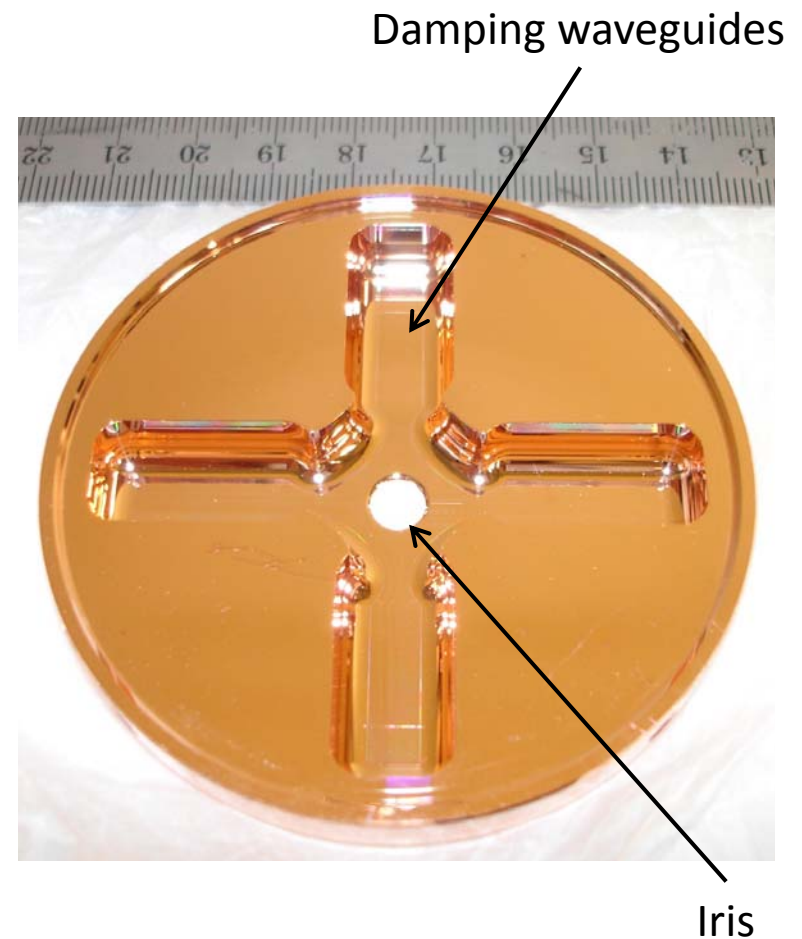
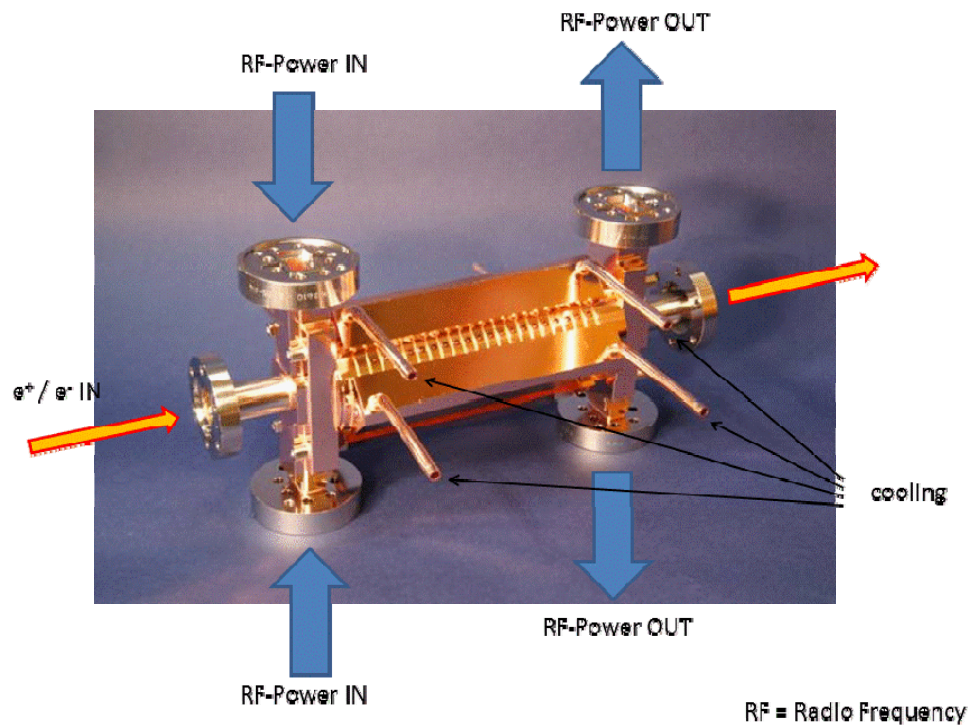
M. Aicheler

CLIC accelerating structure

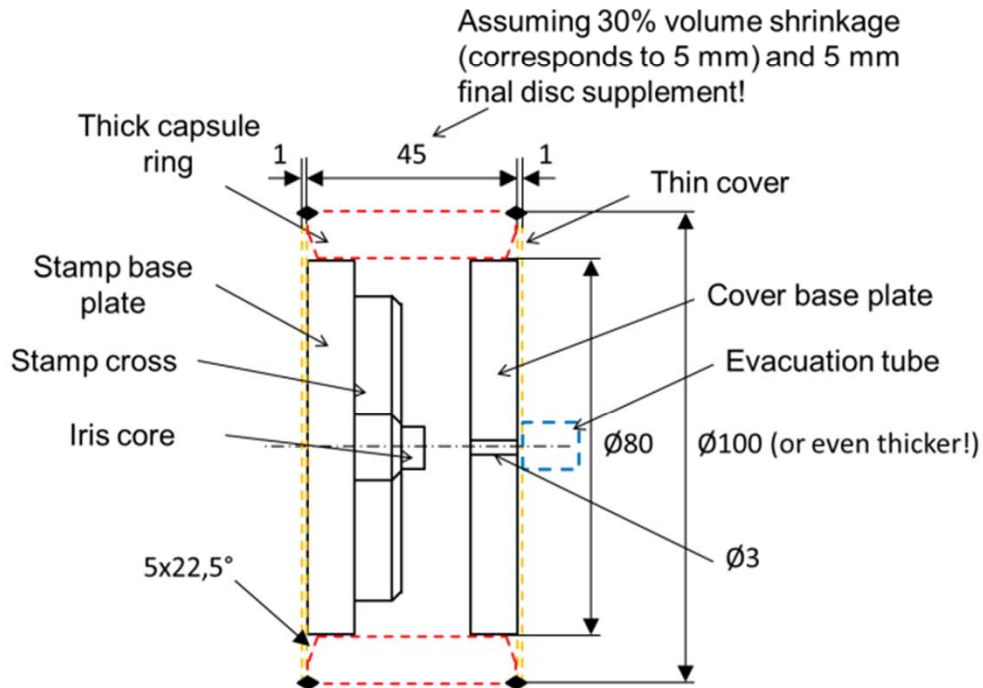
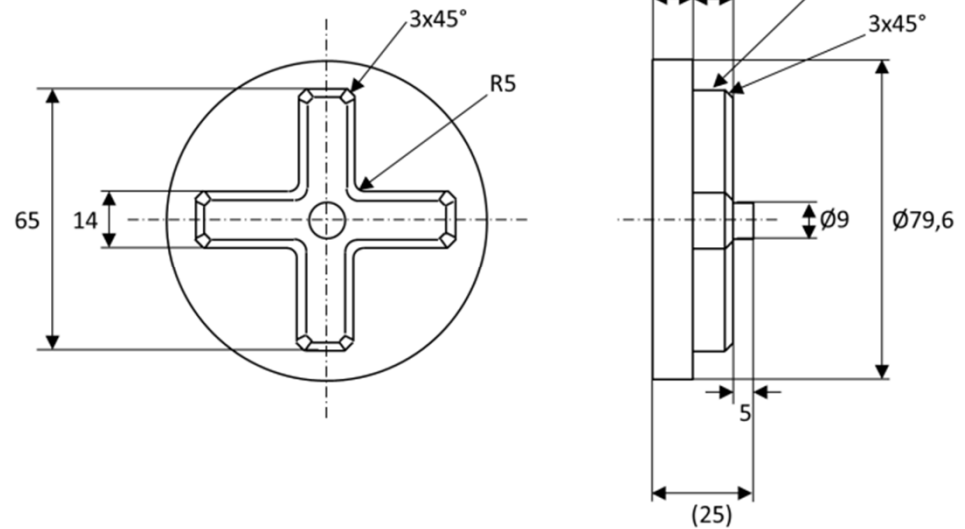
- Extremely high demand of geometrical tolerances and roughness (beam dynamics)
- Need for ultra high precision assembly

Current strategy:

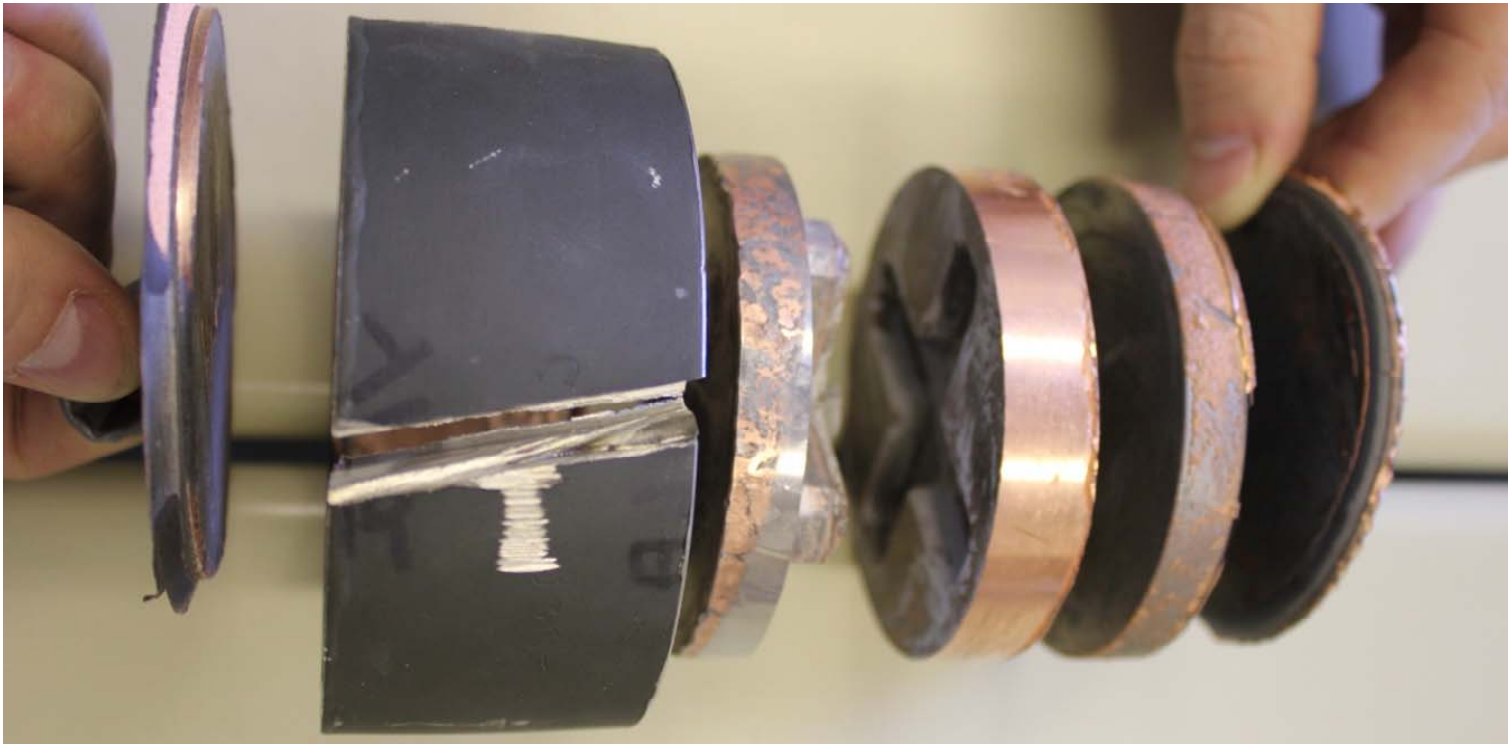
- Bonding of stack of individual discs
- Braze auxiliary systems



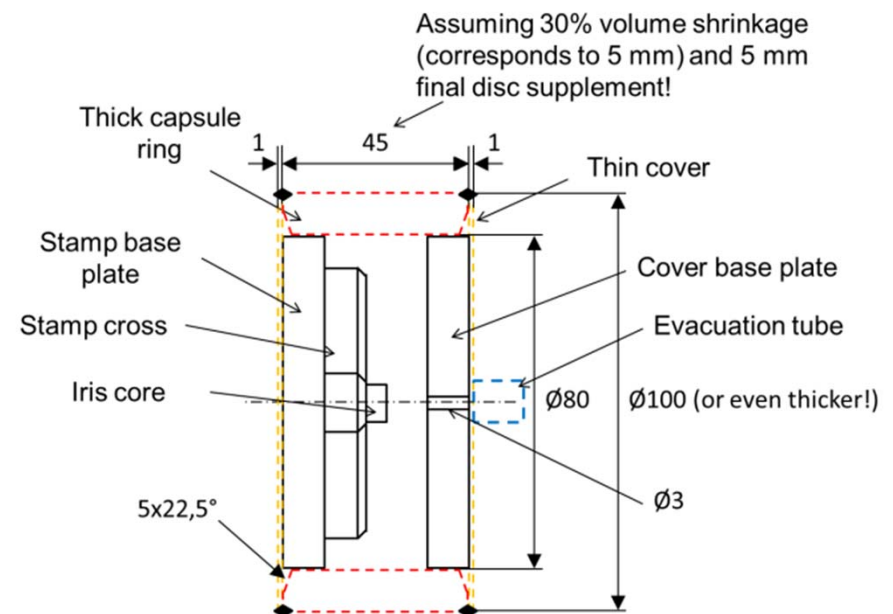
Idea:
 Produce an individual disc from copper powder by Hot Isostatic pressing
 -> simplified geometry as „negative“
 should give the disc near net shape geometry

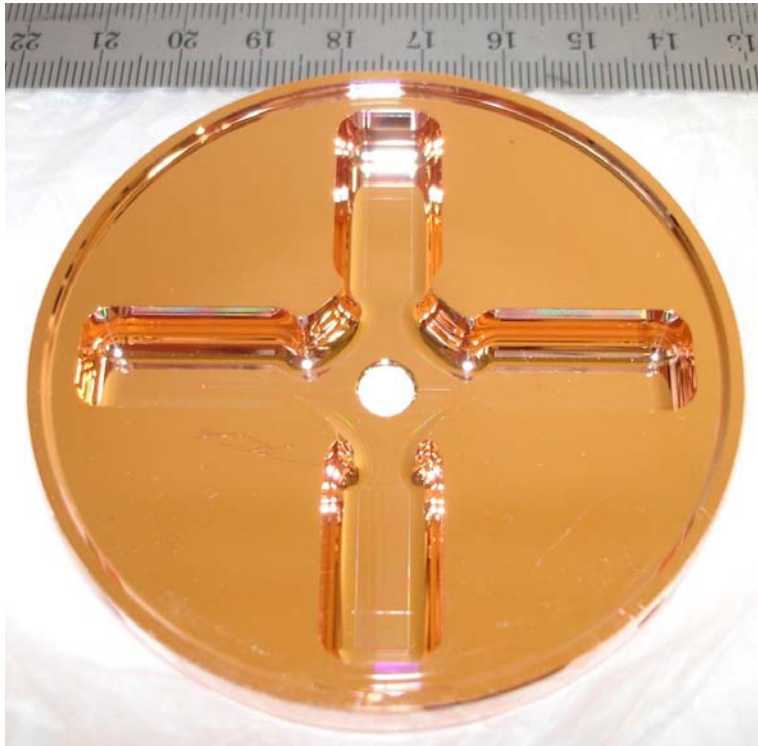


Section of the total capsule with movable plates but hermetic through thin cover



„successful“ dismantlement
 (major difficulties in order to remove
 the thick capsule ring; only possible
 after stress release cutting
 -> destroyed)

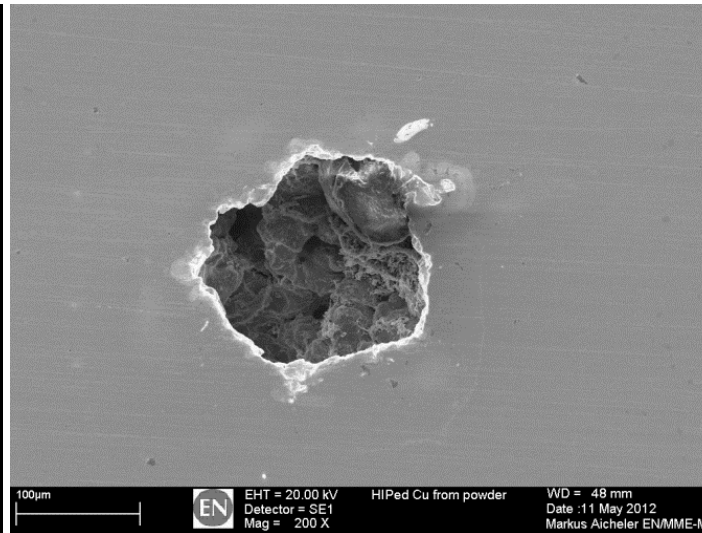
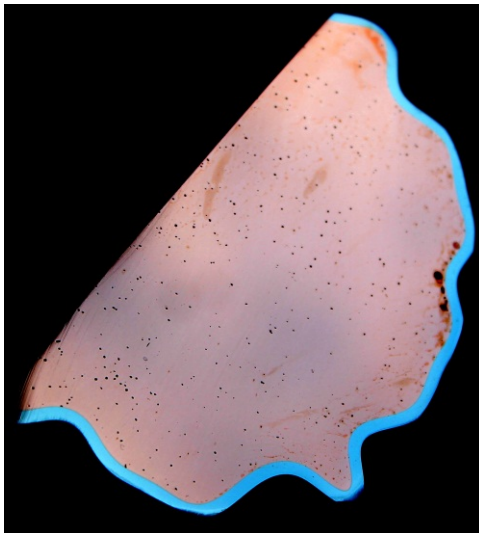




Zinc oxide paste helped keeping copper not being attached to the stainless steel surfaces

Test piece for material characterization

- Same parameters as disc
- Massive block of copper
- Oxygen content measurement
- Mechanical characterization
- Metallographic examination
- Electrical conductivity



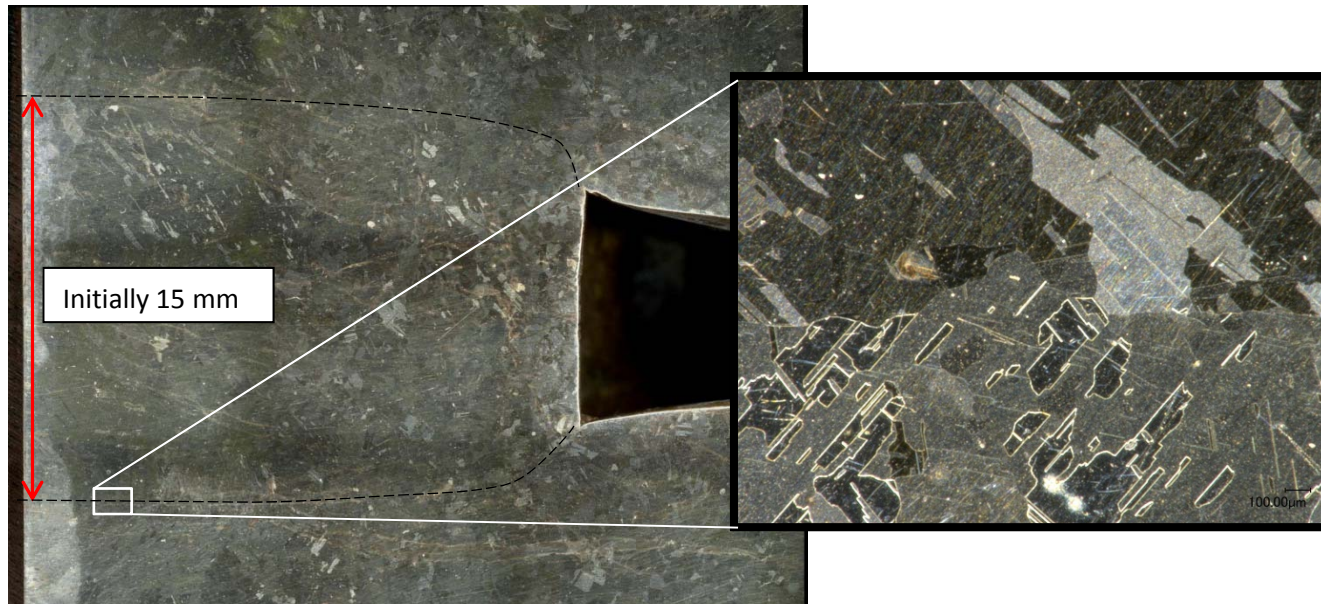
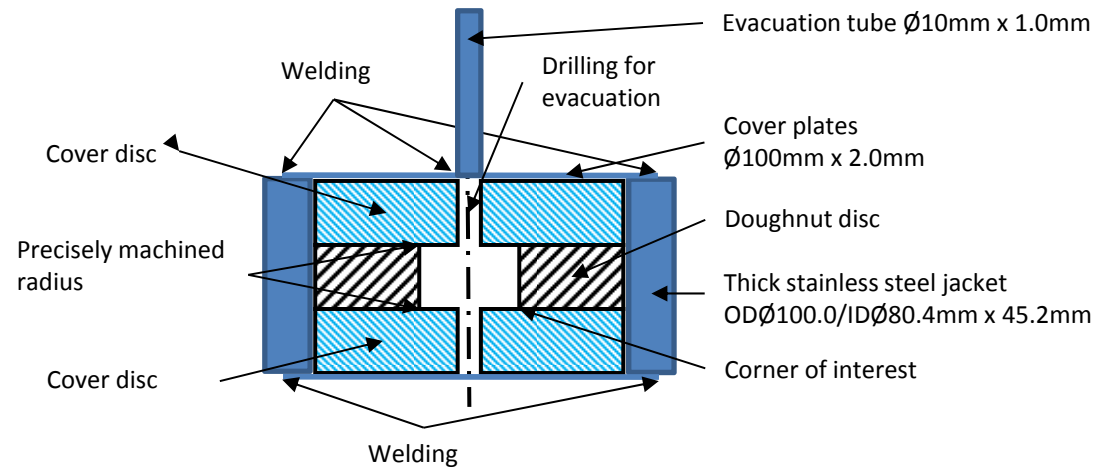
Porosity present in the section

- Appears to be pores of residual gas
- > not acceptable for CLIC AS

Bonding through HIPing

- Simplified geometry stack of three discs
- Bonding Temp 900°C
- Different roughnesses
- Different pressures

Aim was to see how bonding quality is affected



Even with 10 MPa bonding quality is good, but severe plastic deformation

Personal experience as participant in MeChanICs:

- MeChanICs is a program with very interesting concept fostering collaboration
- Very happy and proud to participate in this internationally oriented program
- Secondment at Metso very good personal experience
- Learnt new insights how companies work (efficiency and very much deadlines)
- Learnt to know friendly colleagues of which some became friends
- Learnt to know more about the very interesting finnish culture and the country

Personal gain in terms of career:

- Experience gained (during secondment but also in general through the involvement) is valuable for any future endeavour (industry, academia, EU Project...)
- Opened up the possibility to be further enrolled in MeChanICs
- Thinking about career paths I did not think before...