WP10.2 – Status

L. Bottura

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Status of work

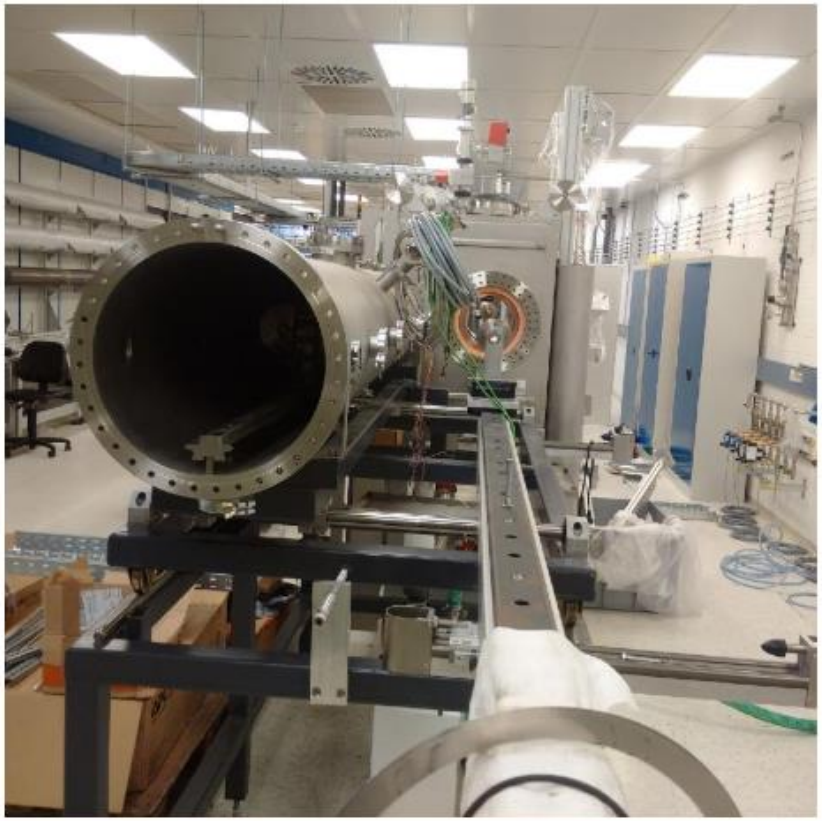
- Last meeting of WP10.2 on March 18th, 2016, see https://indico.cern.ch/event/506777/
- Restarted tape production at Bruker-HTS (A. Usoskin)
- Received all 100 m lengths from alternative sources (SuperPower on the way, A. Ballarino)
- Restarted cable production at KIT (A. Kario)
- Initiated CERN procedure for procurement of several 1 km lengths of tape, up to a total of 5 km (A. Ballarino)
- On-going sample preparation for tests at Twente and Southampton

Tape and cable production

- Produced and procured so far
  - More than 1 km of HTS tape
  - About 60 m of Roebel cable (and 150 m of dummy cable)
  - Agreement on the general plan
    - Feather-0 cables in progress (SuperPower still missing)
    - Dummy production to validate new geometry
    - Feather-2 cables awaiting material from Bruker (production on-going, 60 m sent)

Progress in tape production

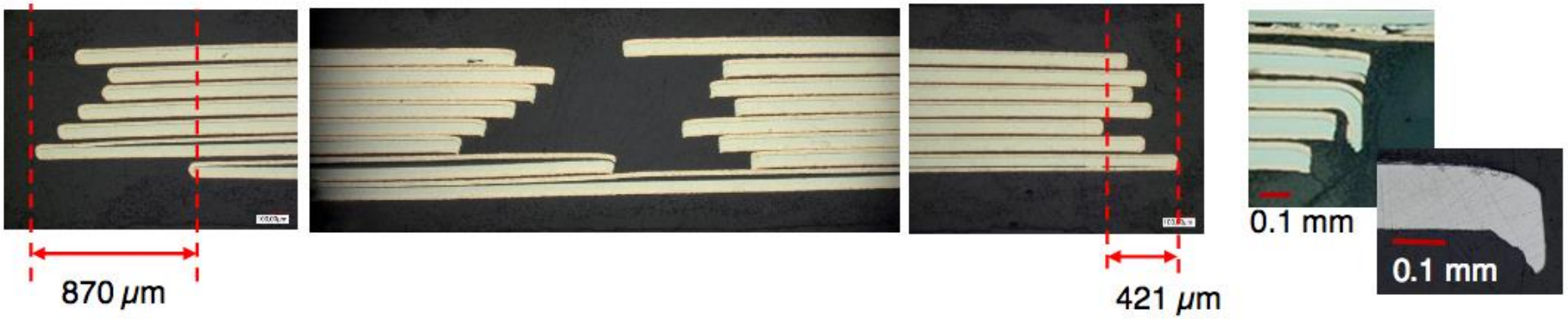
PLD 300 being re-installed (March 2016)



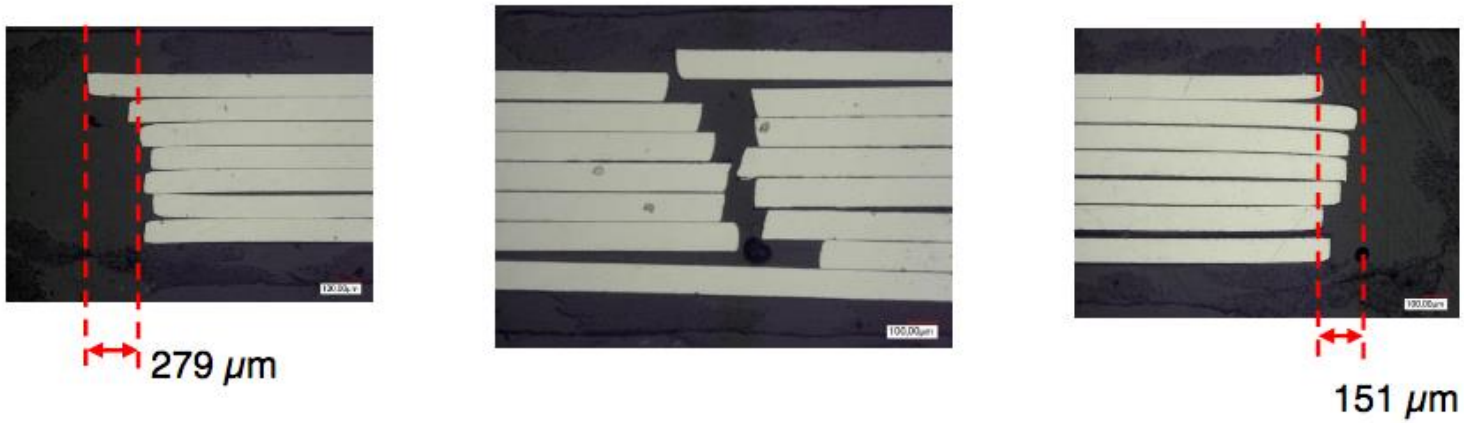
Courtesy of A. Usoskin and U. Betz

Progress in cable production

- Horizontal spacing error in standard cable (5.5 mm wide strands) and the burr



- Error reduced by widening strands to 5.9 mm (laser-cut cable)



Courtesy of A. Kario, S. Otten, W. Goldacker

Tape lengths required for 1 magnet

Magnet	Tape thickness	Cable thickness	Tapes	Cable UL	Tape length
AB	0.14	1.1	13	2x24	2x312
AB	0.1	0.9	15	2x32	2x480
CT	0.14	1.1	13	2x20	2x260
CT	0.1	0.9	15	2x24	2x360

- Minimum length of 0.14 mm tape for 1 magnet: 624 m + drop-out
- Minimum length of 0.1 mm tape: 960 m + drop-out
- EuCARD2 “contractual” quantity: 750 m of 0.14 mm tape from EU Beneficiary Bruker HTS
- CERN has proposed to match with 750 m of 0.14 mm tape, and cover the 1000 m required of 0.1 mm tape
  (actual order being prepared for a total of 5 km of 12 mm tape)

Summary of needs

Model	Dummy UL	Short cable UL	Long cable UL	Other Tape	Other Cable
AB	-	5 x 6m 3 delivered	6 x 32 m 1 delivered	20 m	3 m
CT	3 x 24 m		3 x 24 m		6 m

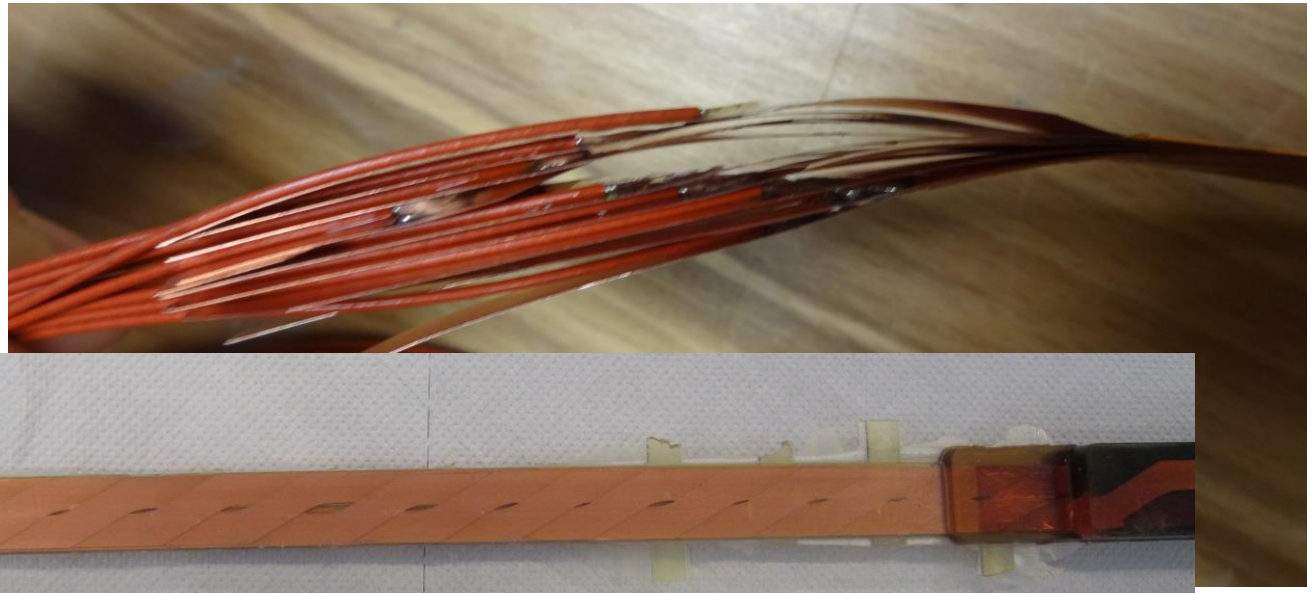
- Stacked tapes test needs
  - 50 m of 4 mm dummy (SS tape, Cu-coated) delivered
  - 50 m of 4 mm HTS tape
- Reduce the CT variants to avoid the need of multiple tooling and multiple cable lengths

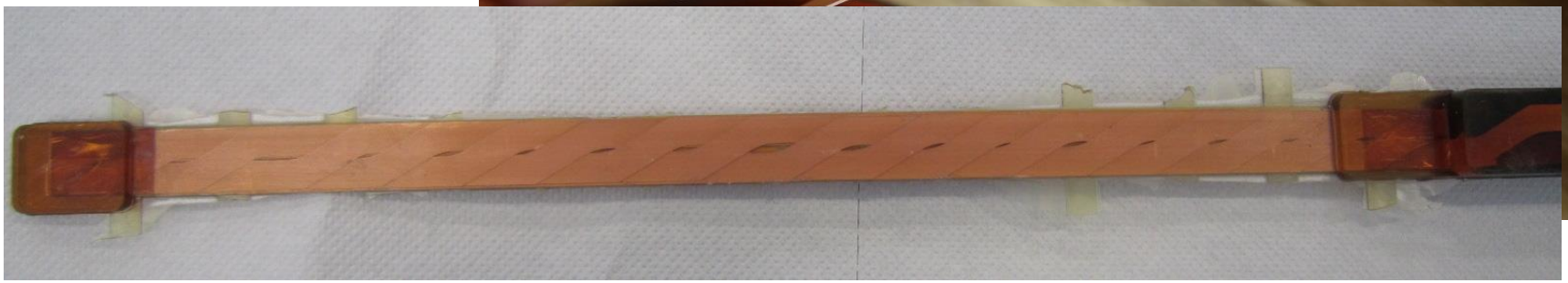
What do we need to do ? Tests

- Ic measurement on Roebel cables
  - Two samples available at CERN
- Transverse pressure experiment on Roebel cable
  - KIT has produced cables, CERN provides insulation (Twente impregnates – training required)
  - AC loss measurement and analysis: CERN to fabricate 2/3 new samples for inter-tape measurement/AC loss
  - A final effort on striation? Discussion
- Quench experiment
  - KIT/Bruker delivered 2 mm tapes at Twente
  - Cable test as final characterization ? Discussion
- BSCCO cable test
  - On hold given limited availability of OPHT furnace

AC loss samples

- New samples (3) in preparation for the measurement of magnetization and inter-tape resistance Rc (single tapes are cabled to V-taps)
- Measurement at Twente of parallel magnetization to distinguish the contribution of hysteresis and coupling, and derive Rc
- PhD student from Twente has trained in impregnation with CTD-101K. CERN to send a resin material kit to Twente





Items to be addressed by cable tests

- Insulation system compatibility
- Stress tolerance and effect of discontinuities in mechanical support
- Joint technology for the magnet connection
- Quench and protection features
  - Propagation speed
  - Tmax
  - Degradation limits

Other items to be discussed

- Details of test program and objectives
- Test in EDIPO (in discussion)