U.S. MAGNET DEVELOPMENT PROGRAM

# MDPCT1b Magnet Disassembly


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# Introduction

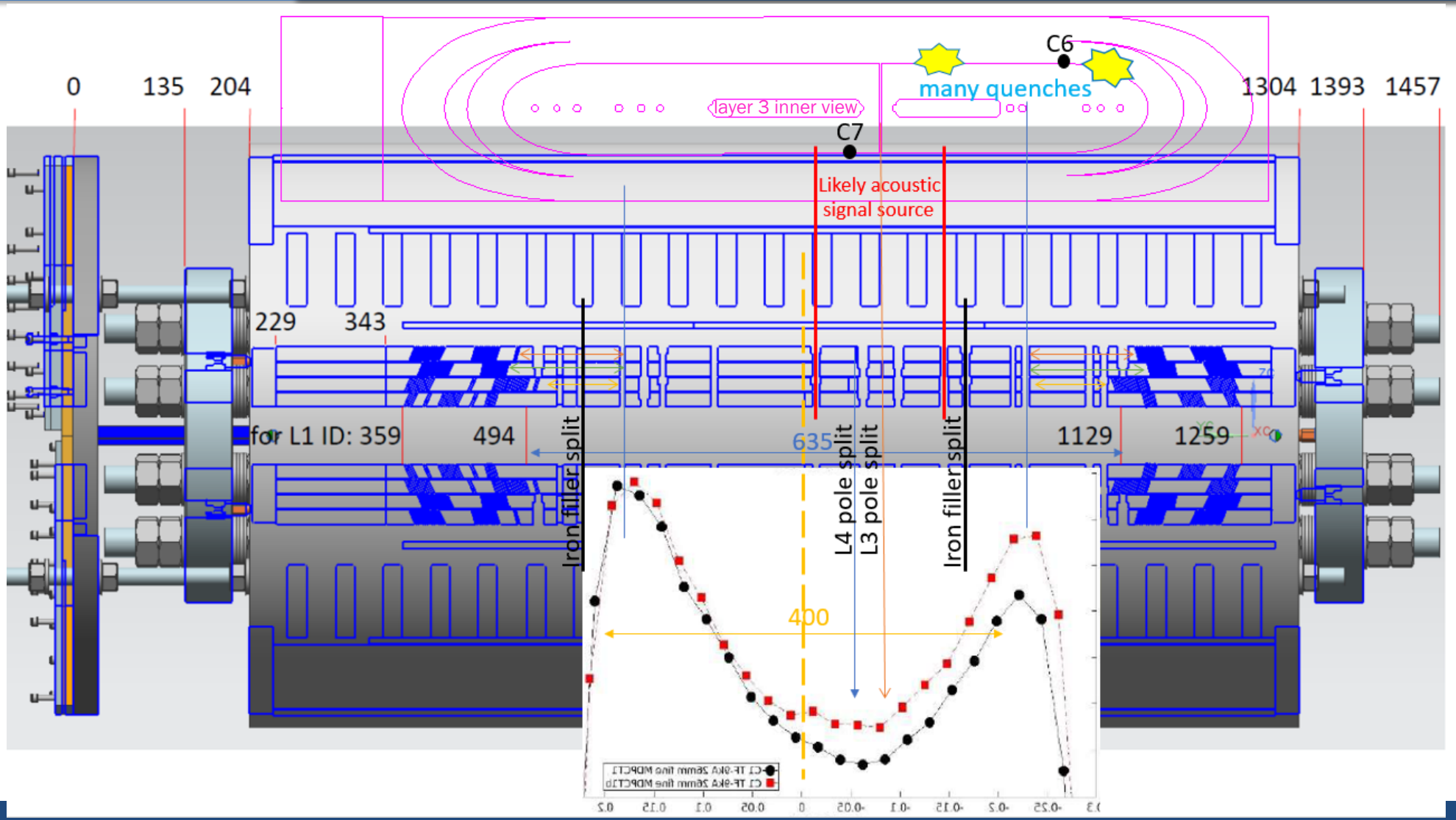
MDPCT1b results from the cold test:

- training quench locations
- big acoustic signal and magnet degradation
- TF difference for two last cold measurements, test 1 and test 2

Focus on:

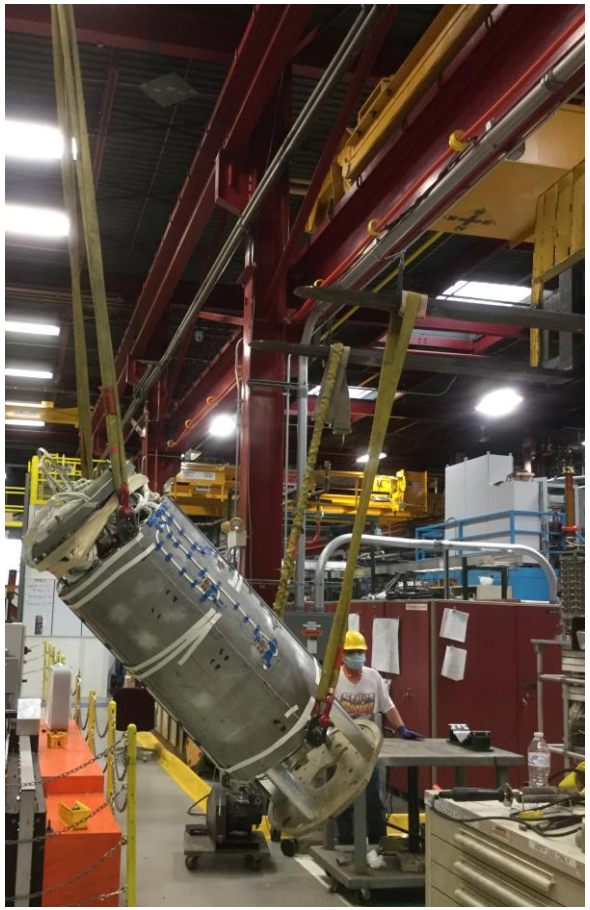
- structural integrity
- coil's condition

# TF Difference for Two Last Cold Measurements, test 1 and test 2



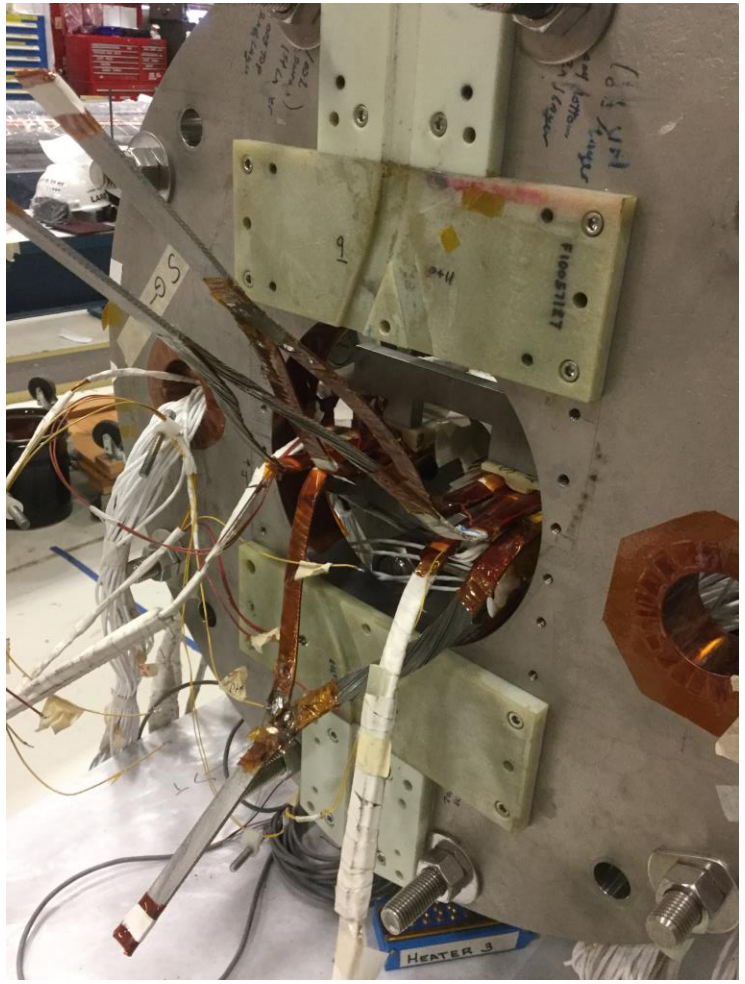
# Magnet lifting and rotation after disconnection from the top plate

Magnet lifting from the VMTF pit



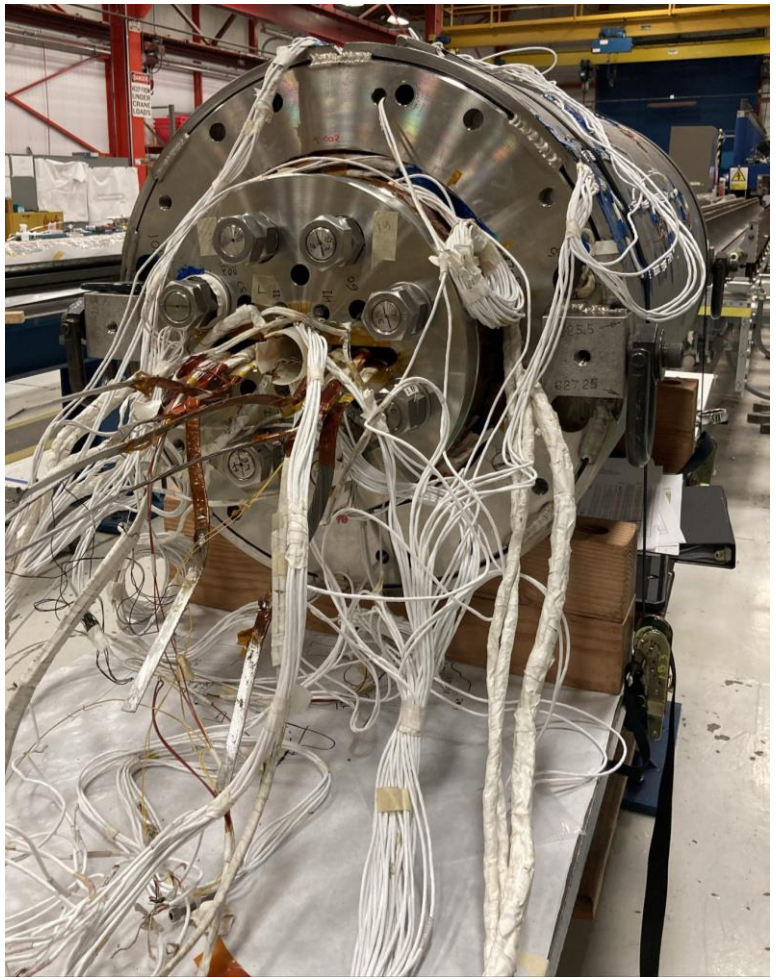
Magnet rotation procedure

# Magnet electrical check, leads and VTs disconnection, “pizza box” removal




Magnet leads disconnection

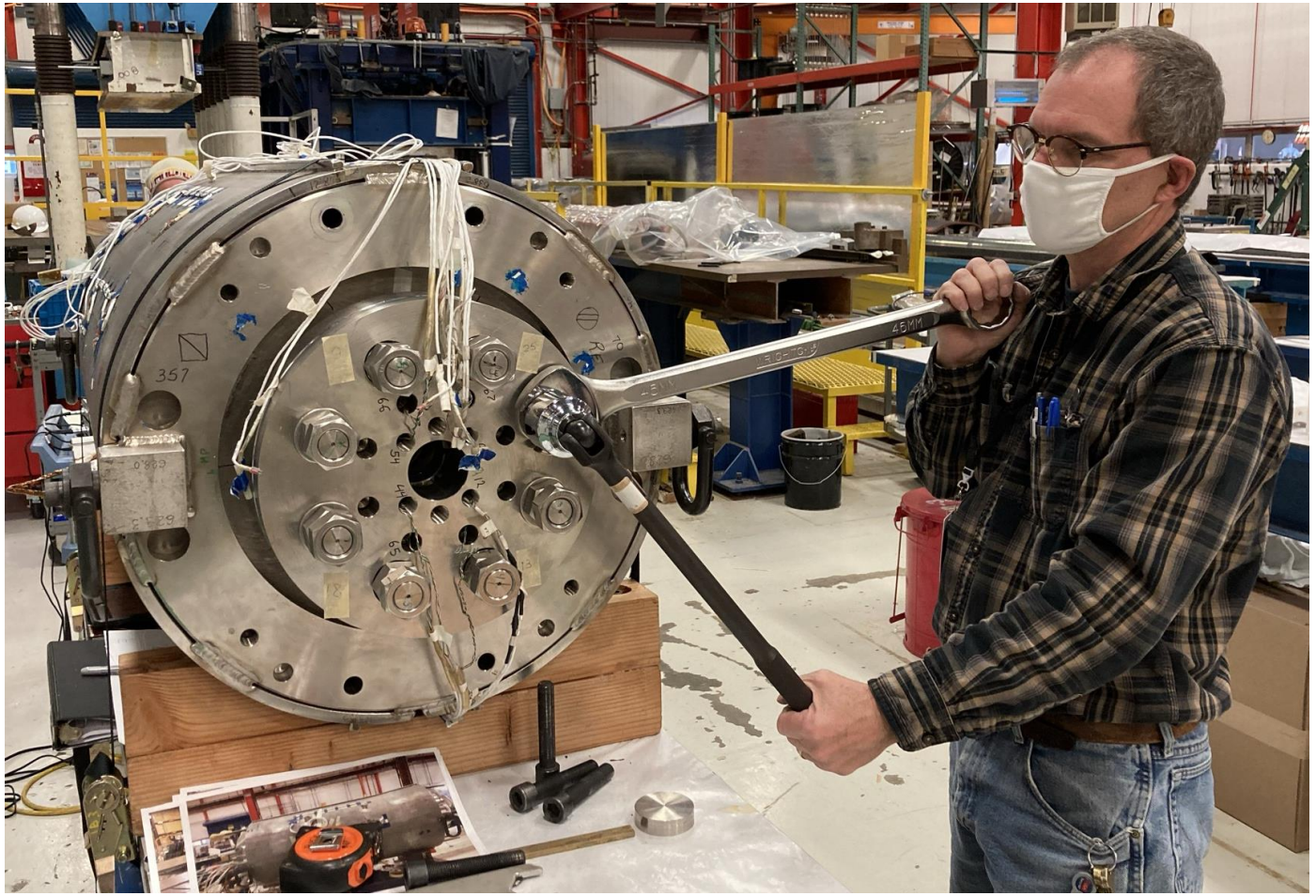
Lead’s plate removal



Braking wire bundles

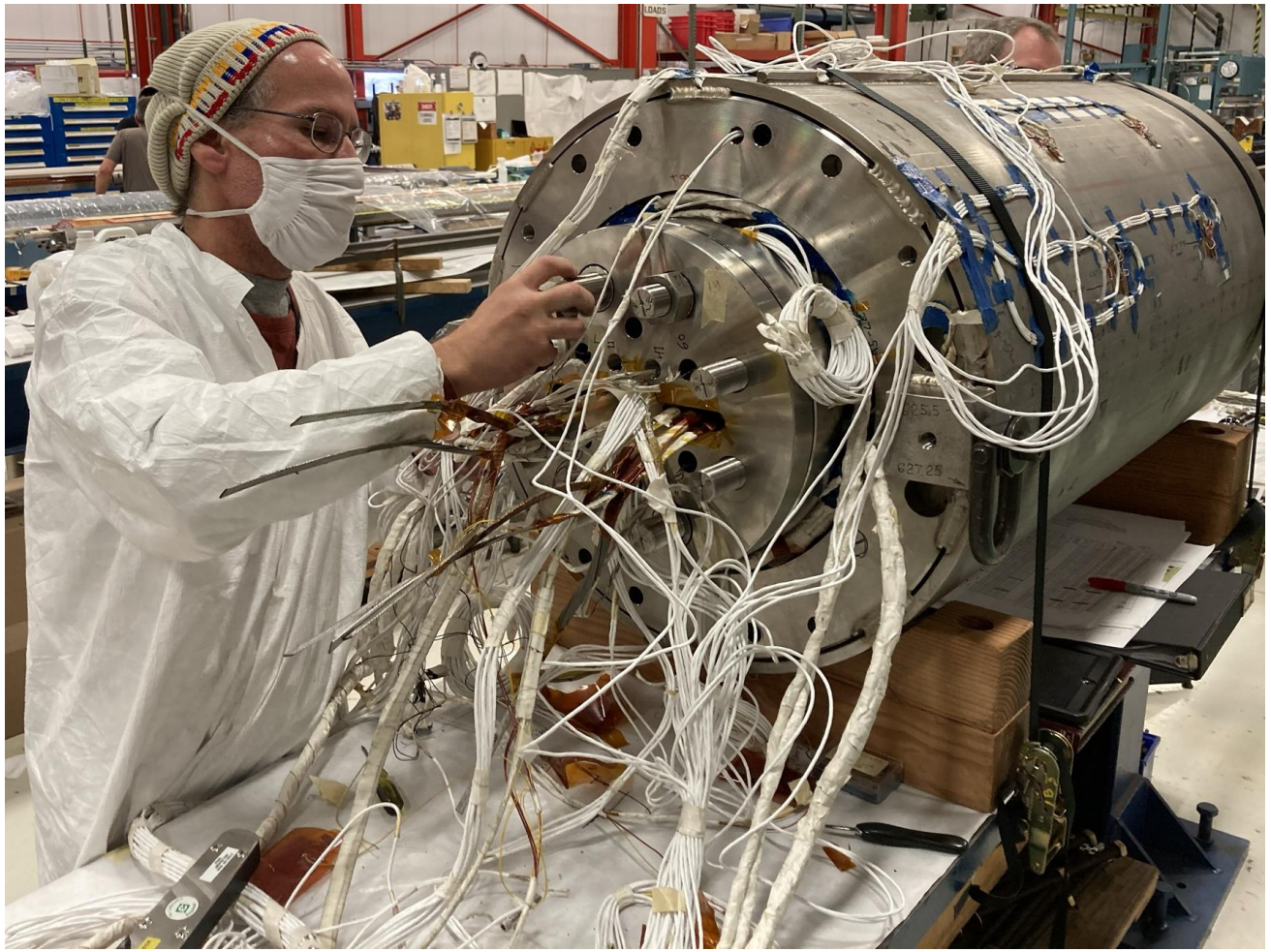
# Bullets and bolts unloading

Bullets unloading at RE

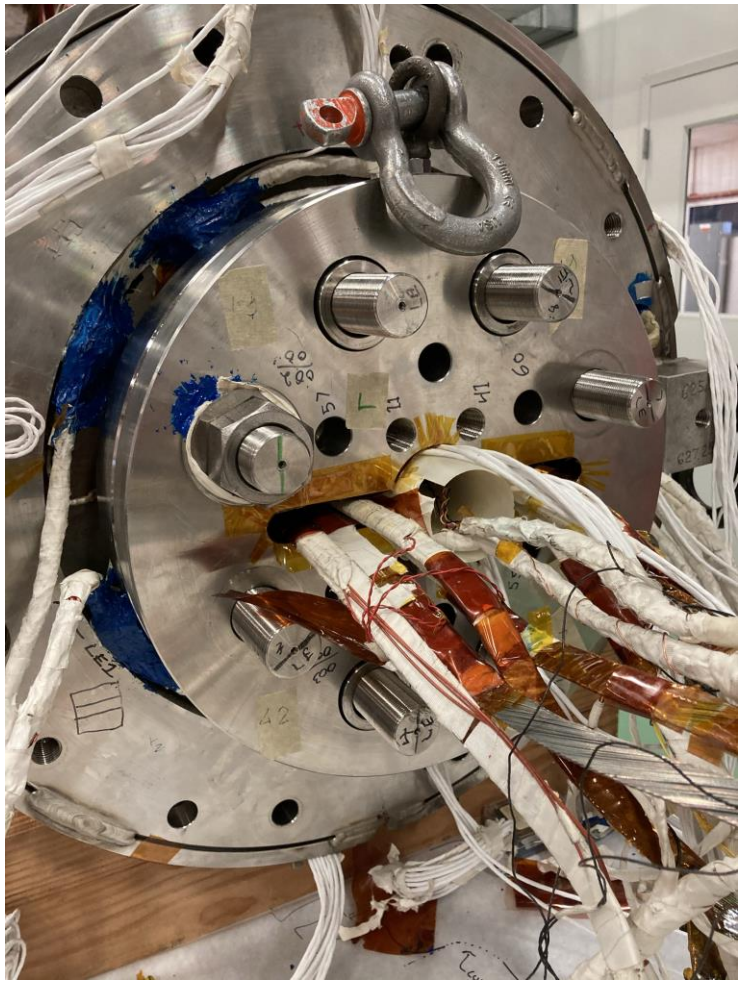


End plate nuts unloading at RE

# End Plates removal at LE



End plate nuts unloading at LE



L1/L2 end plate at LE

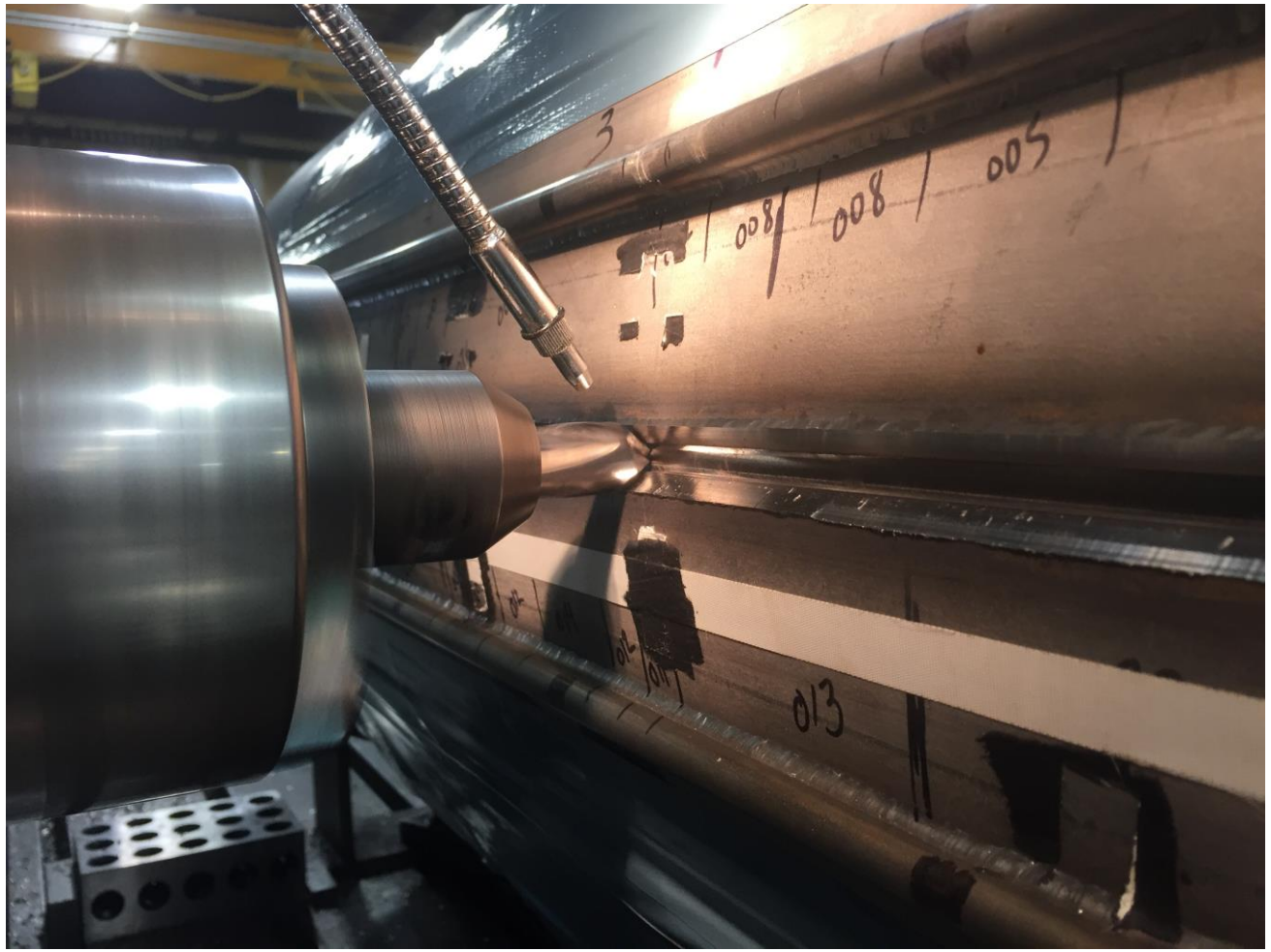
# Magnet preparation and transportation to VMS

Magnet at IB3 ready for transportation

Magnet unloading at VMS

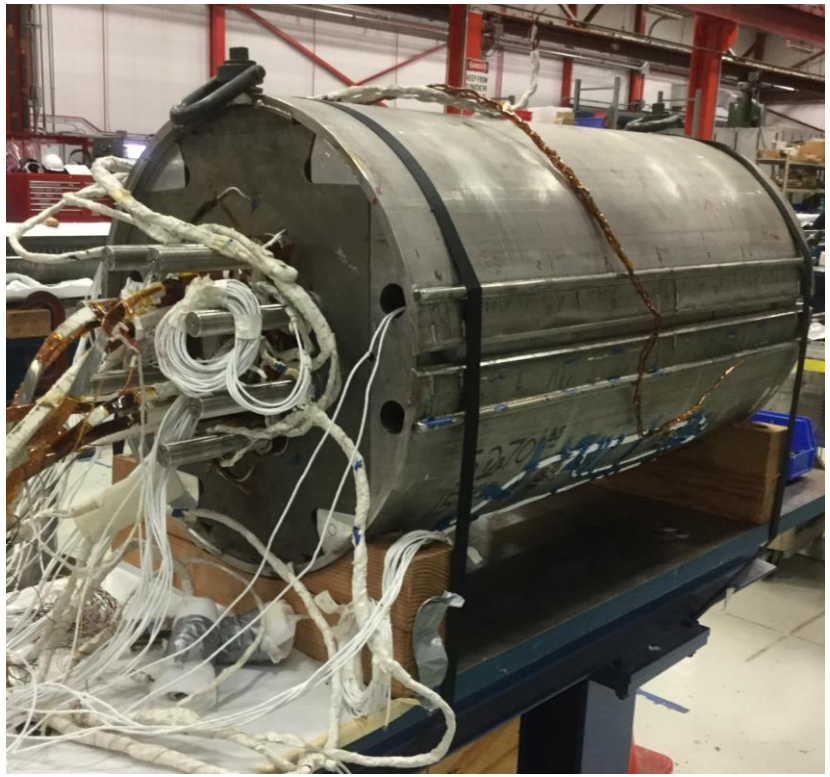
# Milling work

Magnet set up for the end ring cutting




Milling of the weld-prep

# Magnet at IB3 assembly table



Magnet on the assembly table at IB3

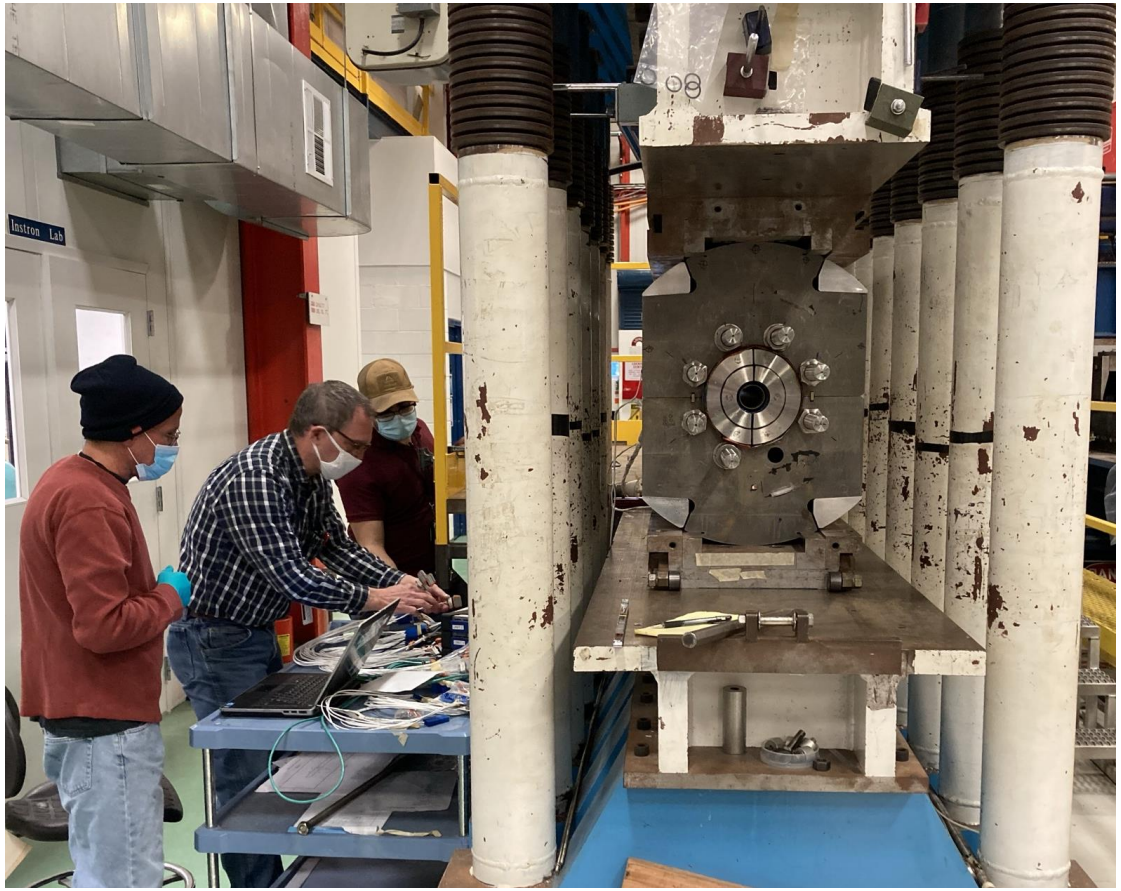
Lifting of the top shell

Removal of the yoke fillers

# Clamped Iron Yoke


Transporting the iron yoke assembly from the shell to the clamping tooling

# Magnet in Press and Clamps Removing




Strain gauges reading

Clamp  extraction

# Clamps Removing

Magnet iron w/o clamps under press load

Removed clamps on the table

# Clamp Inspection with Dye Penetrant

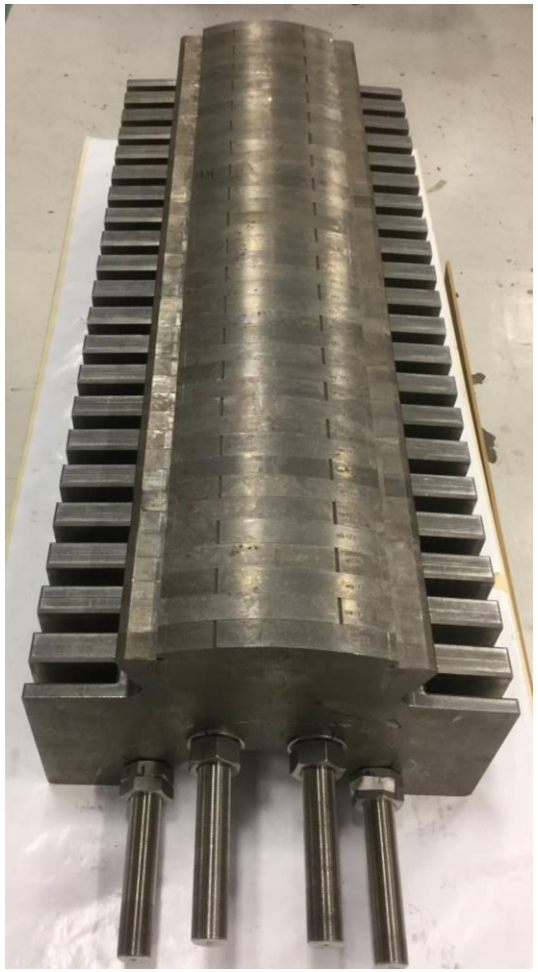
Visual inspection of the clamp

“Painted” clamps on the table

# Iron Yoke

Iron yoke w/o clamps in clamping tooling

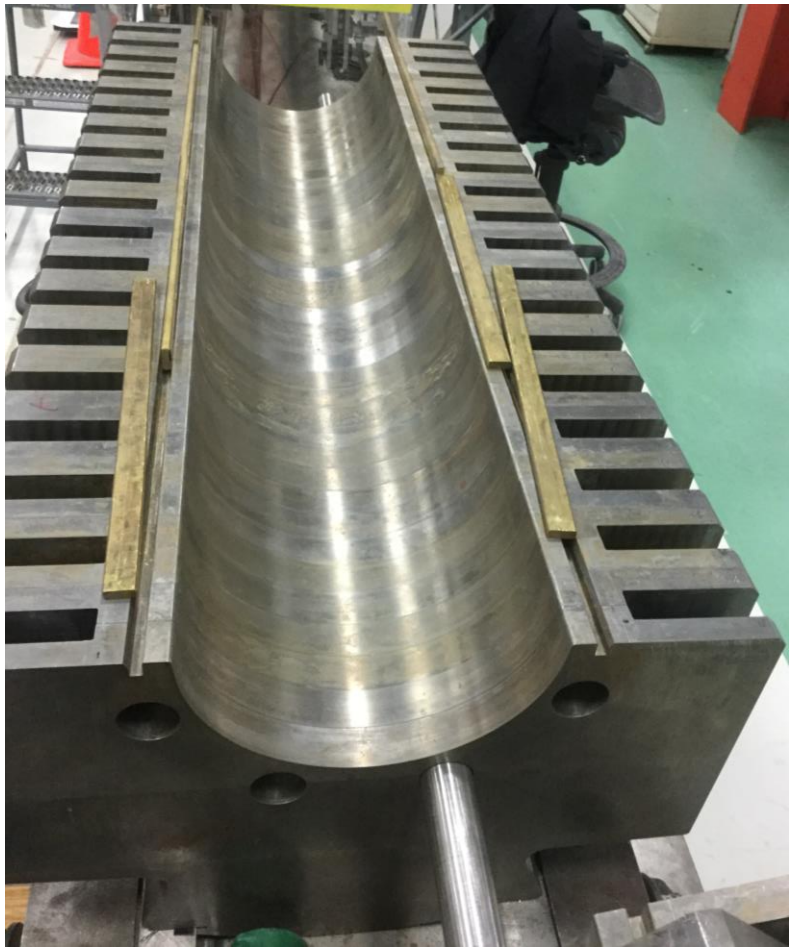
Lifting of the top iron yoke



Top iron yoke

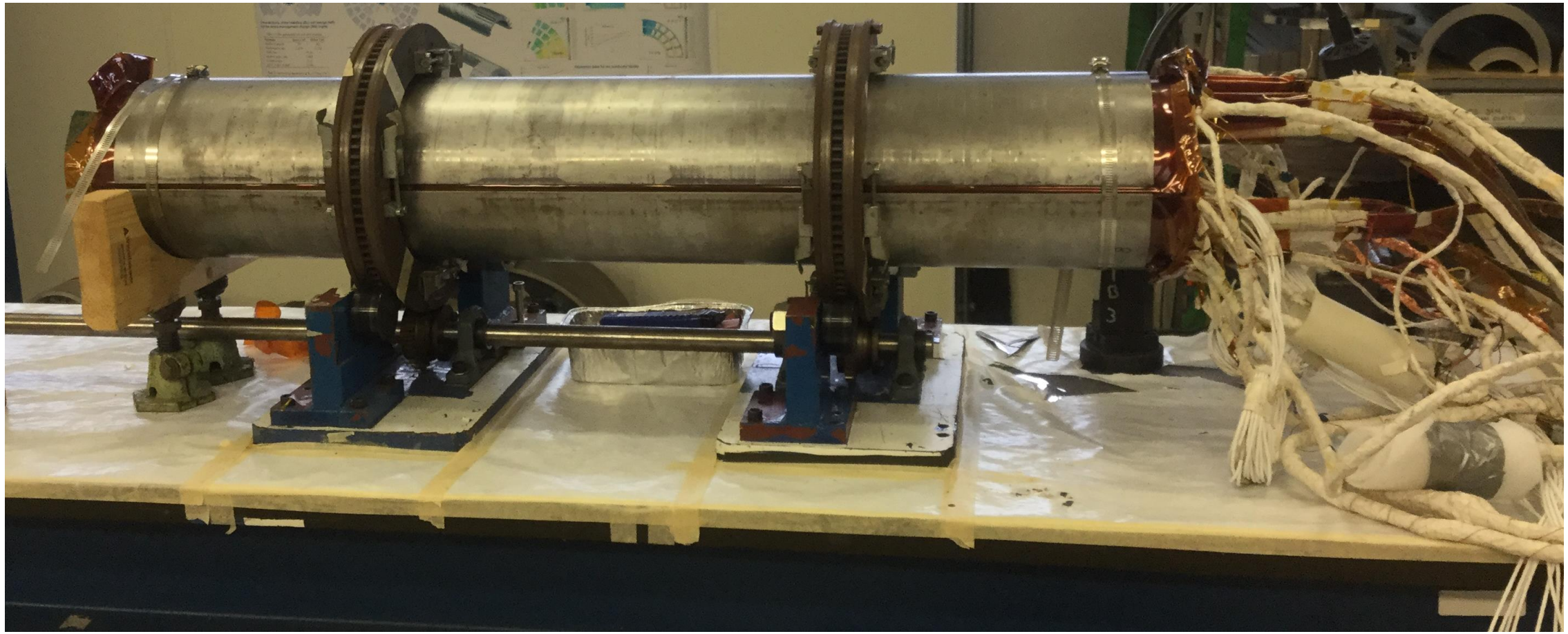
# Coil Block Lifting

Lifting of the coil block



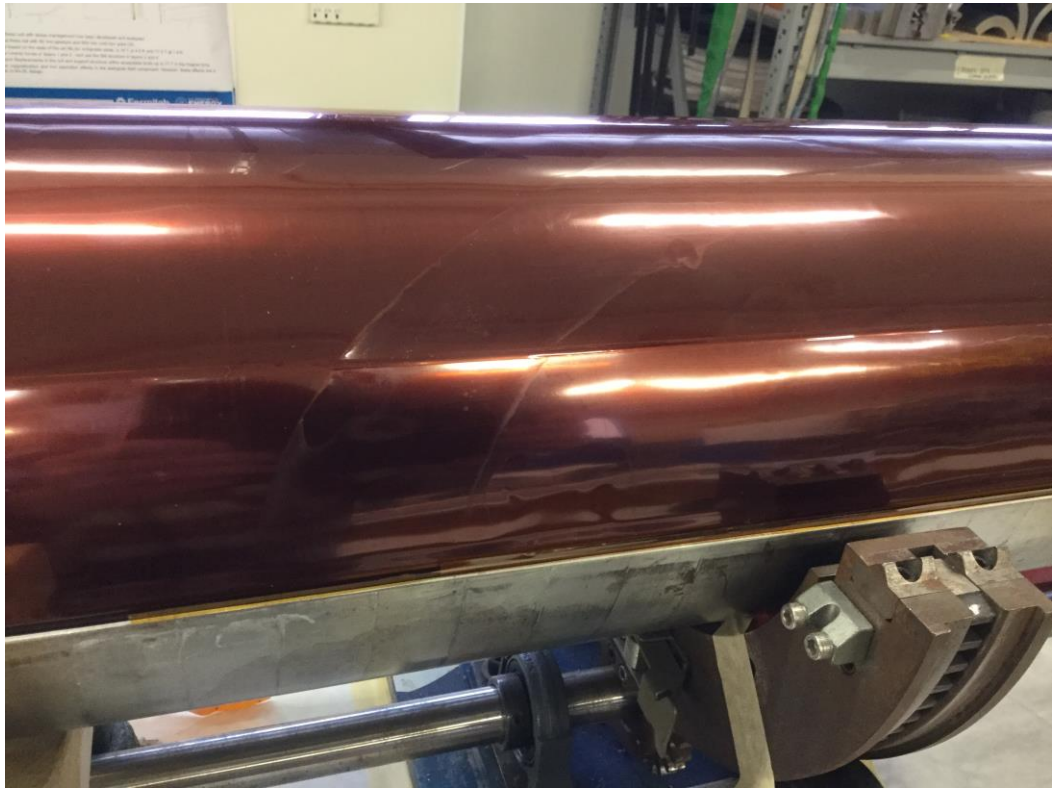
Bottom iron yoke

# Coil Block on Rotation Table



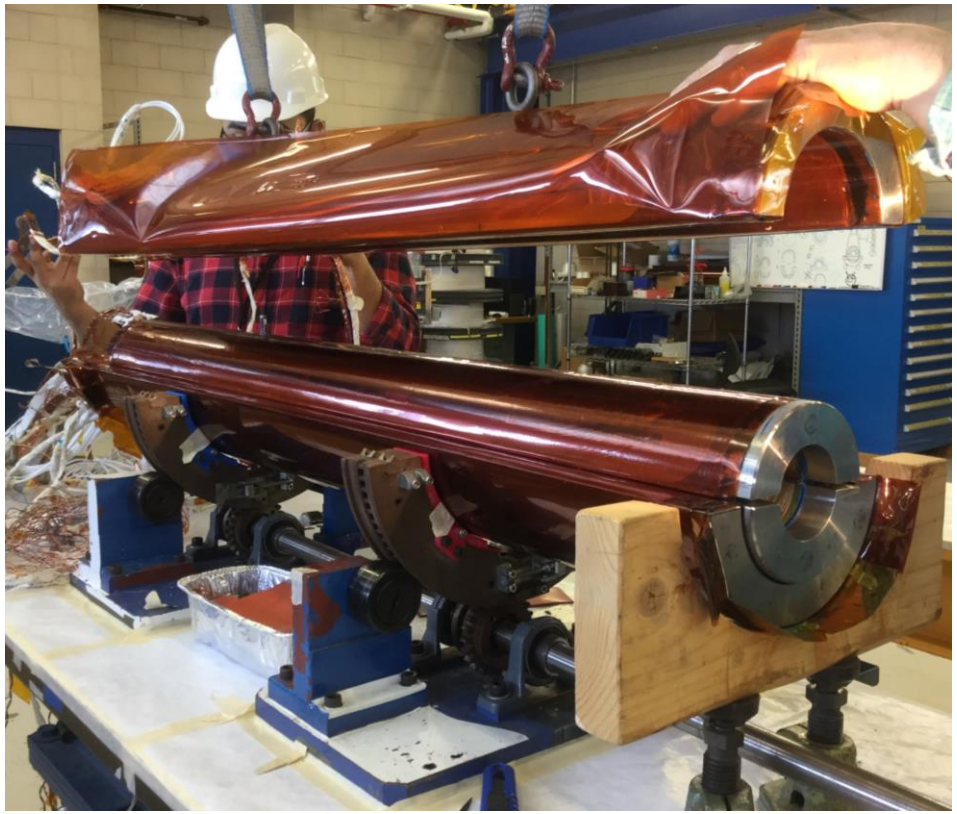
Coil block on the rotation table is ready for the wiring work

# Coil Block Disassembly



RE view of the coil block GI

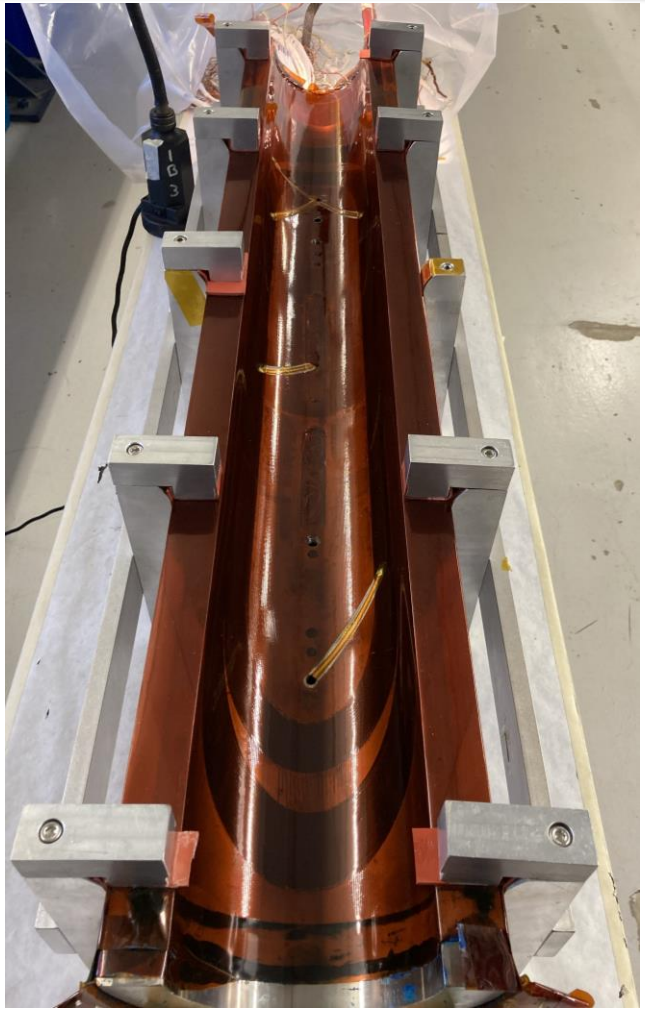
# Coil Block Disassembly



Lifting of the outer coil

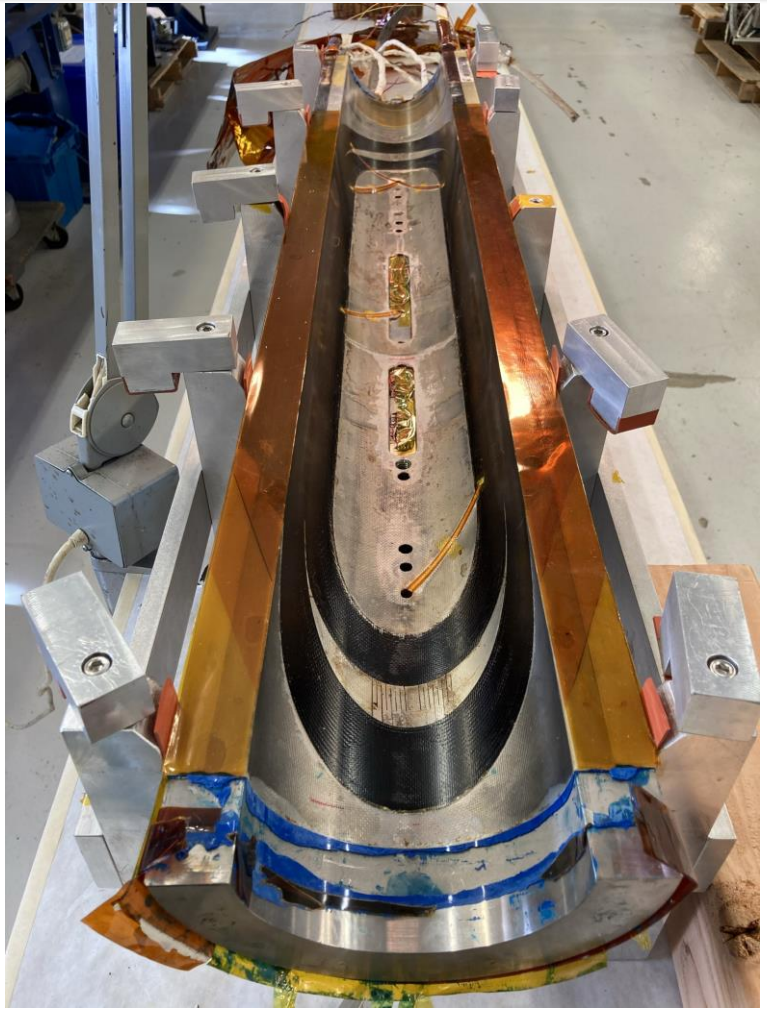
Outer coil in the holding fixture

# Outer Coil #5



Outer coil, inside view

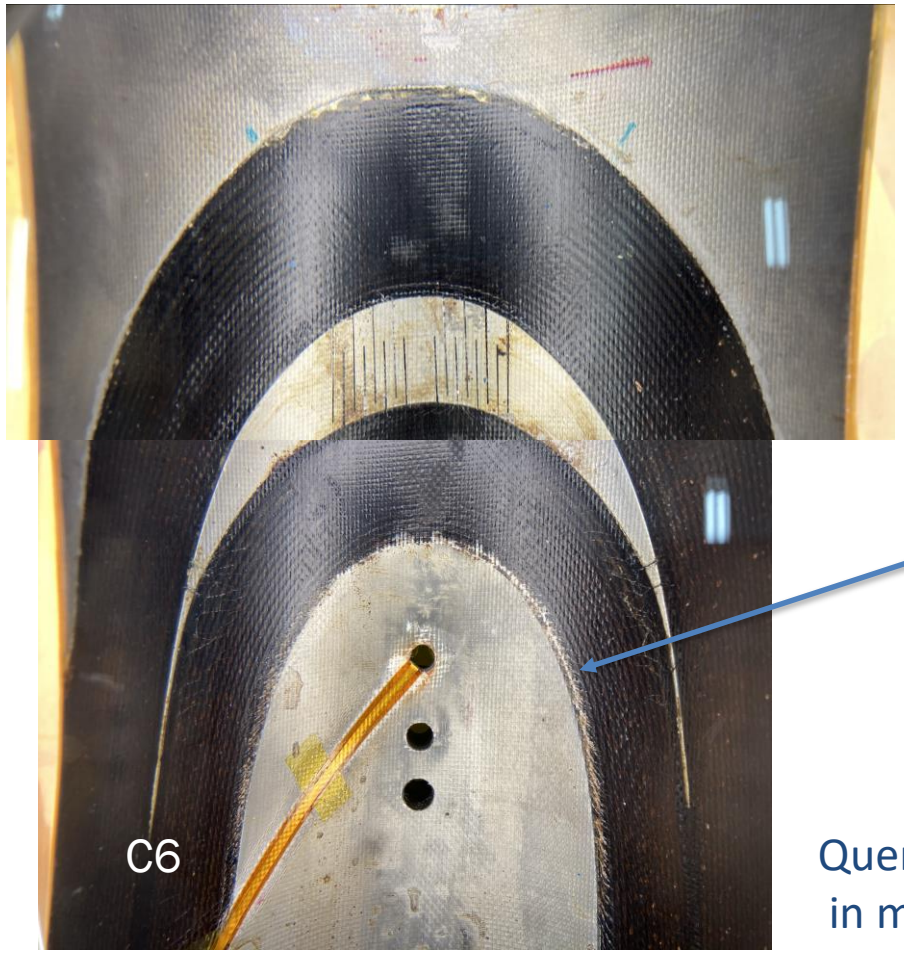
Inter-layer insulation



Inside view after insulation removed

# Outer Coils #4/5 – Inner Layer View, RE after Test 2

Coil 4



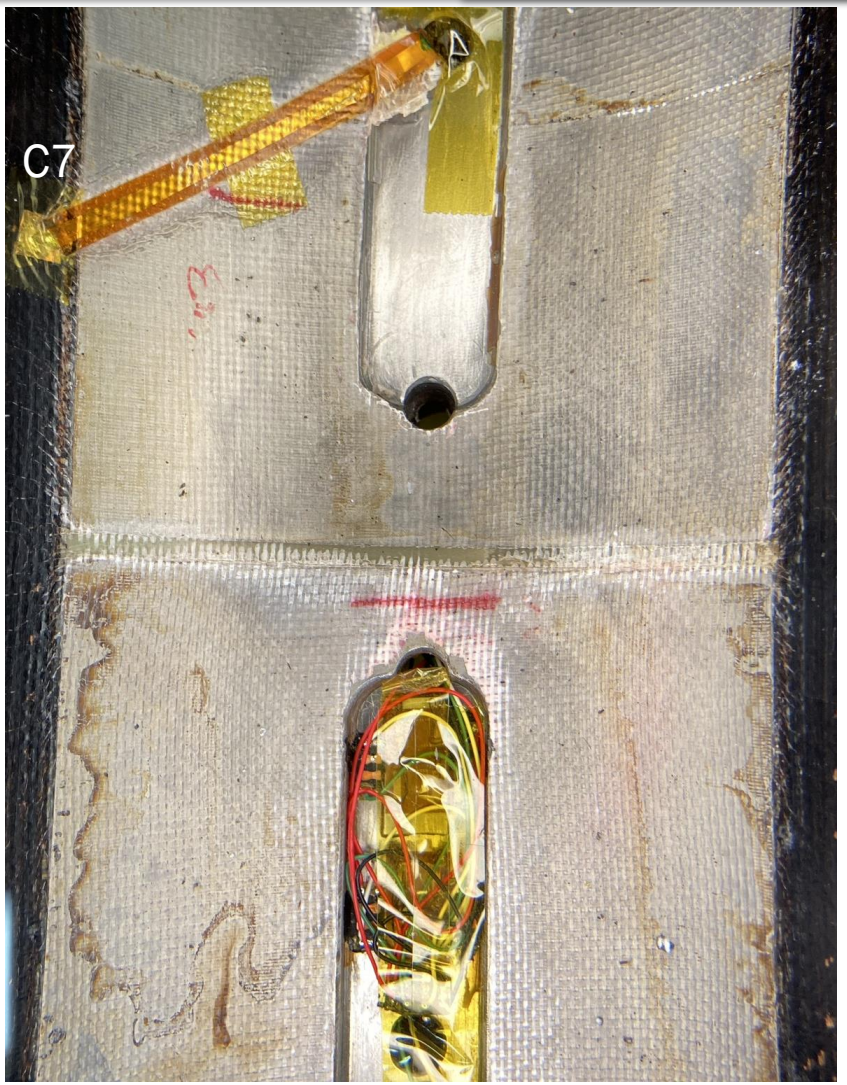

Pole turn whitening

Quench locations in many ramps

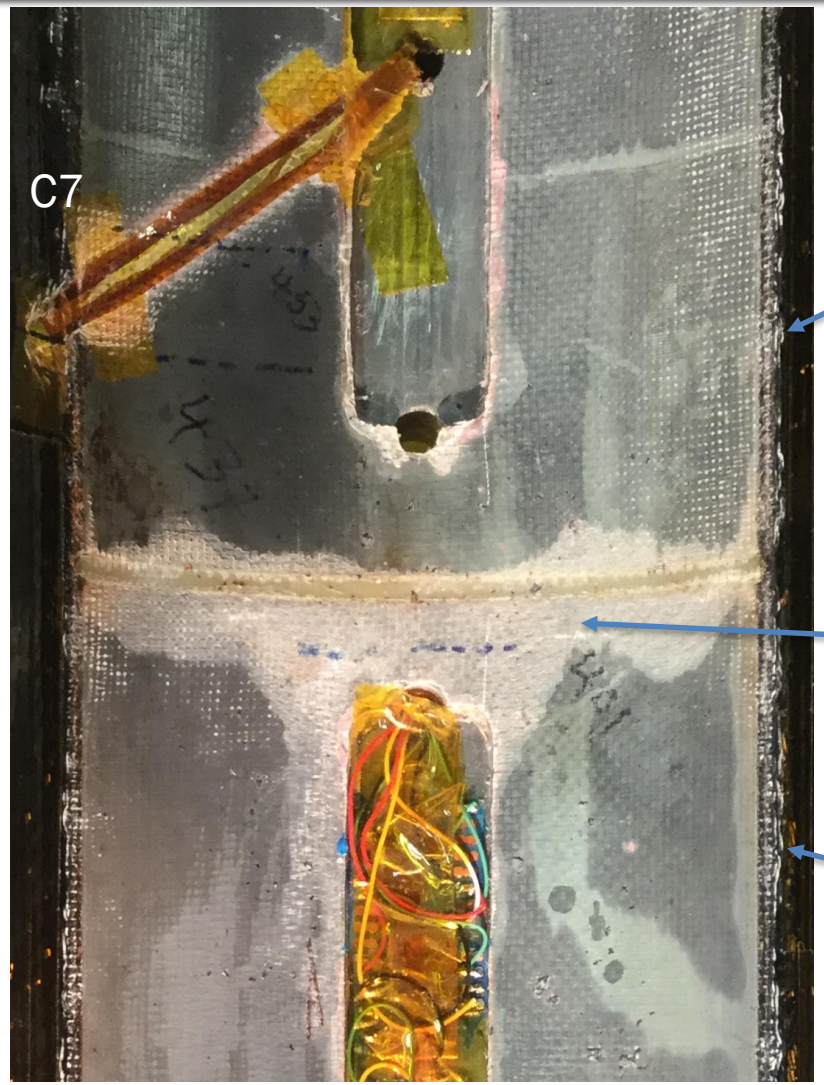

Coil 5

# Outer Coil #4/5 – Inner Layer View, Pole Split after Test 2

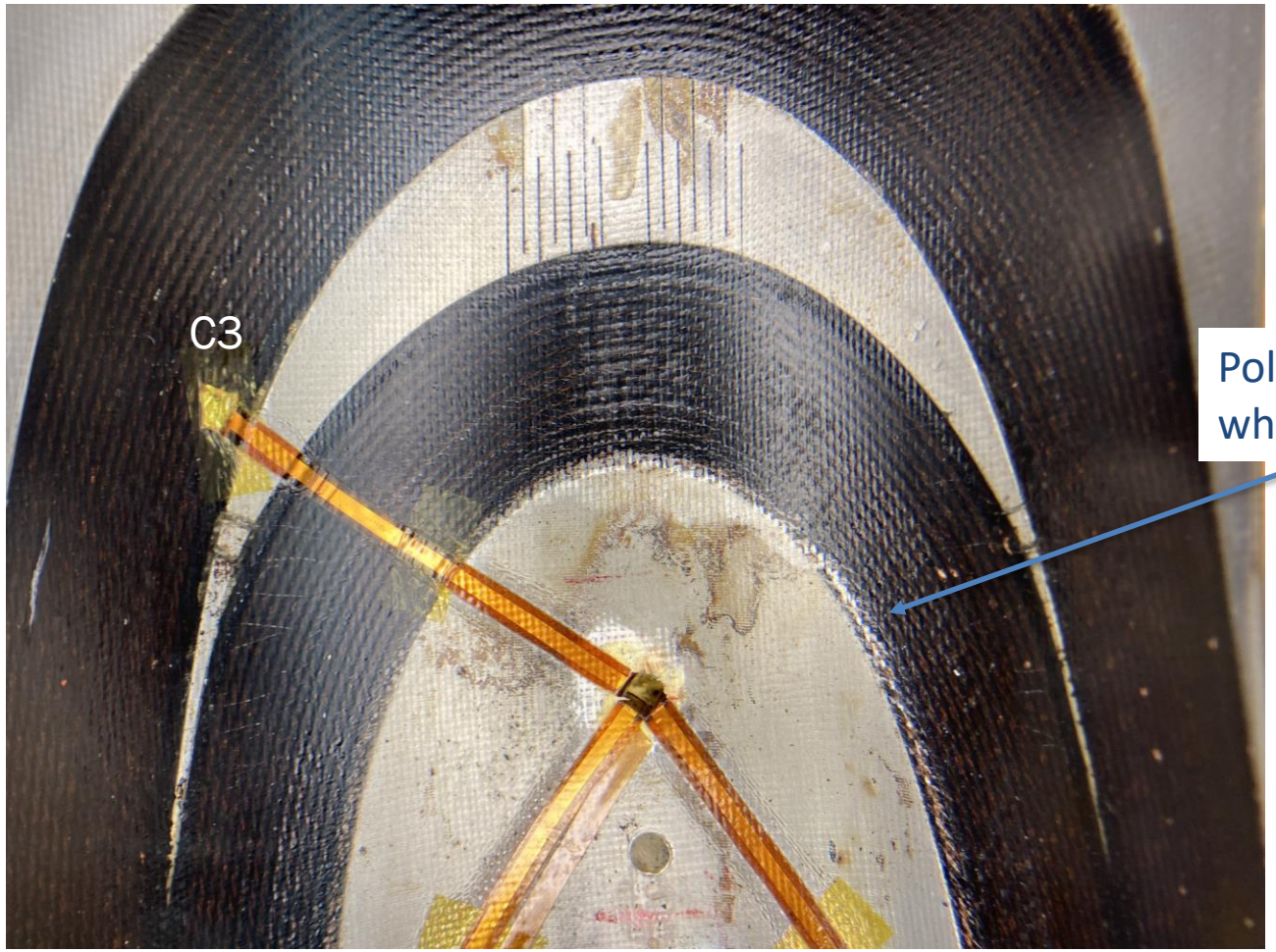
Coil 4




Coil 5

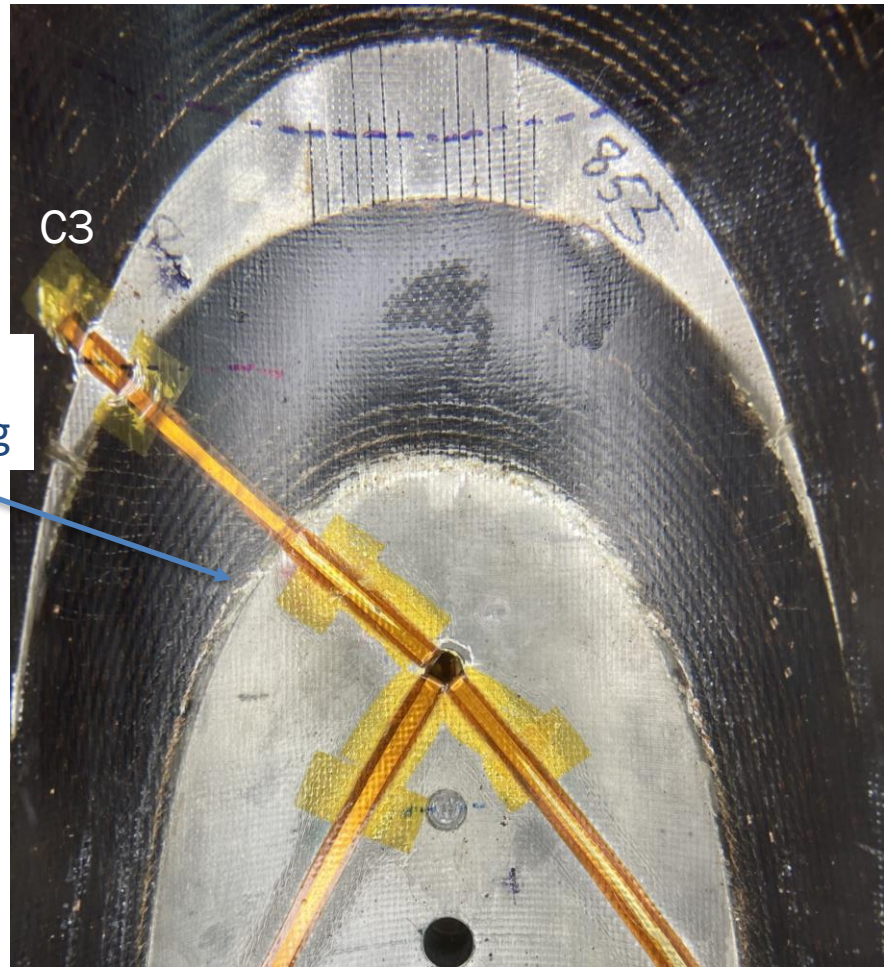


# Outer Coils #4/5 – Inner Layer View, LE after Test 2



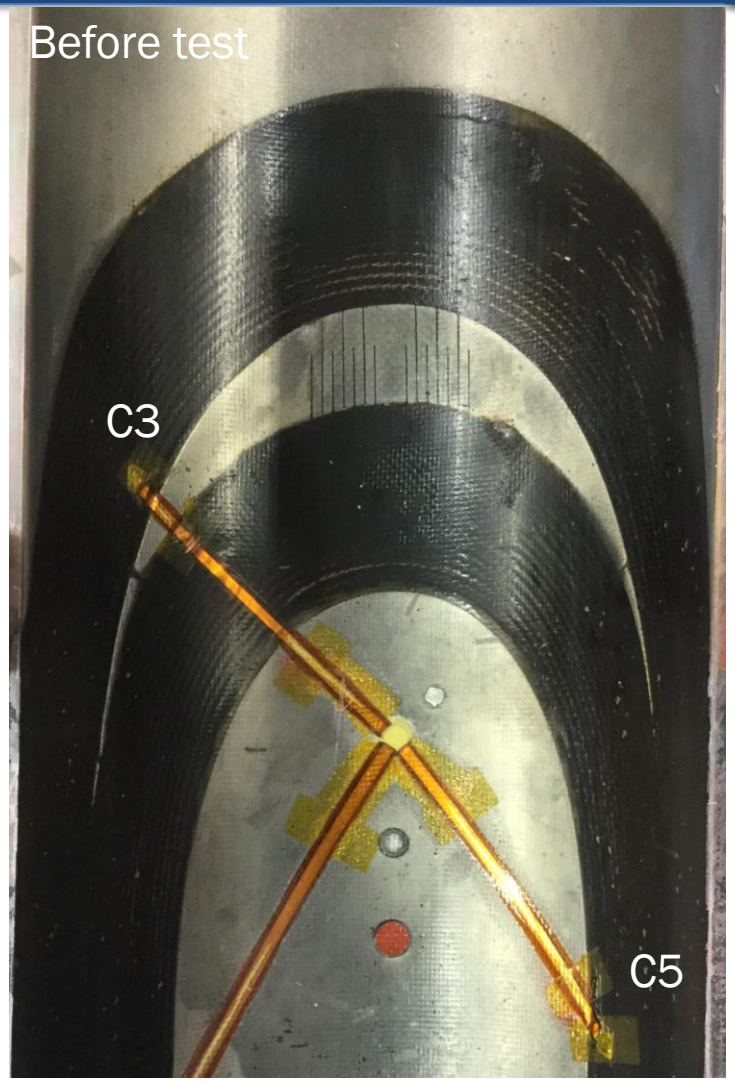

Coil 4

Pole turn whitening




Coil 5

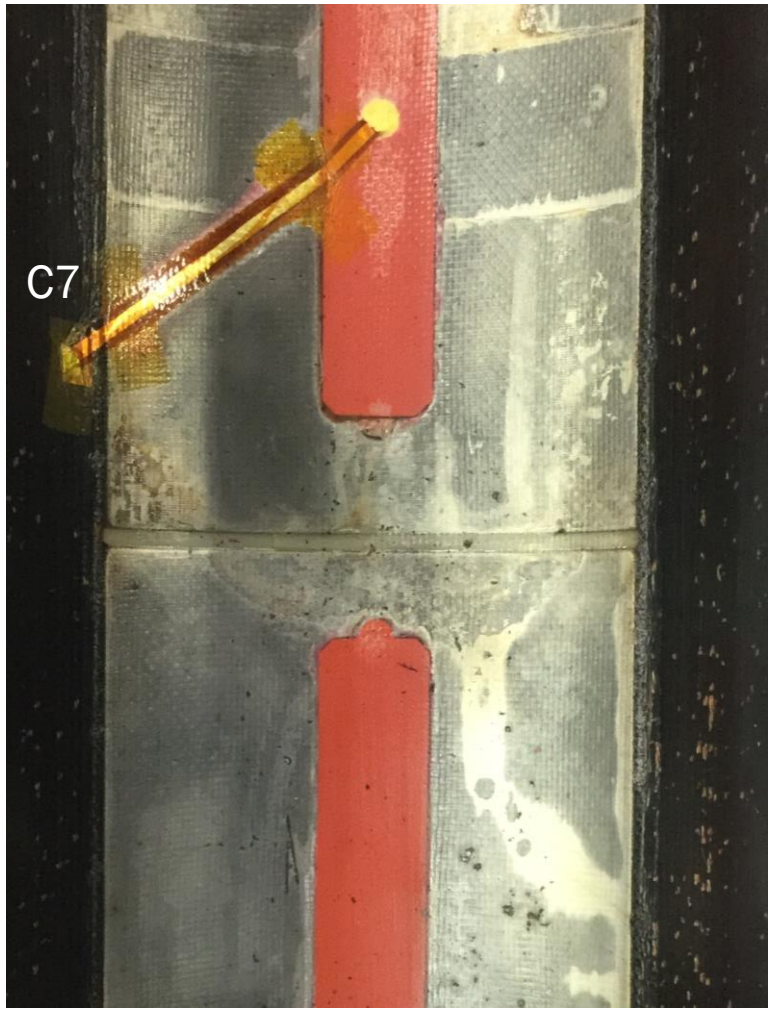
# Outer Coil #5 - Inner Layer View, LE



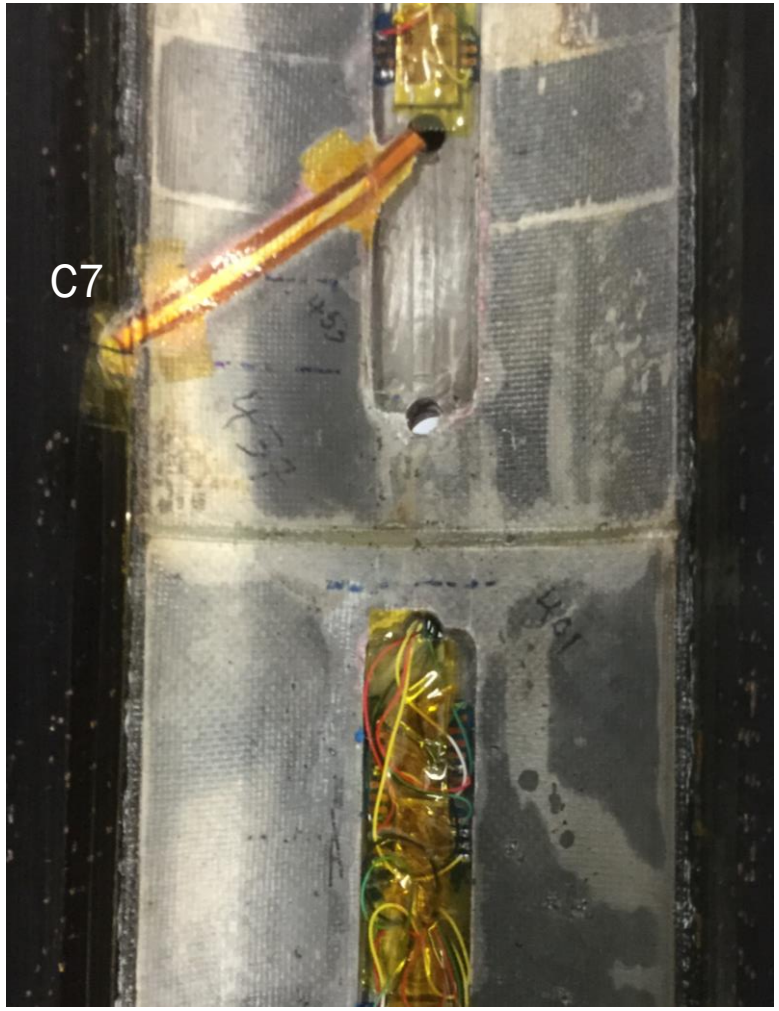


# Outer Coil #5 – Inner Layer View, Pole Split

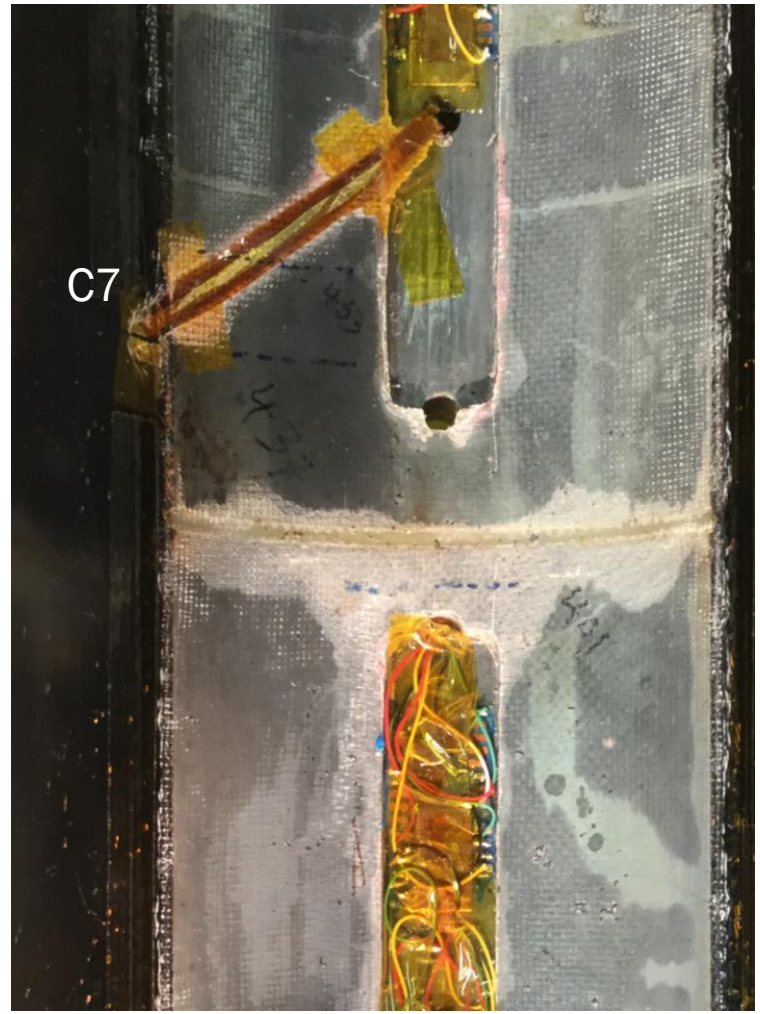
Before test




After test 1




After test 2



# Outer Coil #5 - Inner Layer View, RE



# Outer Coil, Inner Layer View, RE at Different Stages


After curing | After reaction | Before impregnation | After impregnation | After cold test

# Outer Coil #5 – Outer Layer View after Test 2

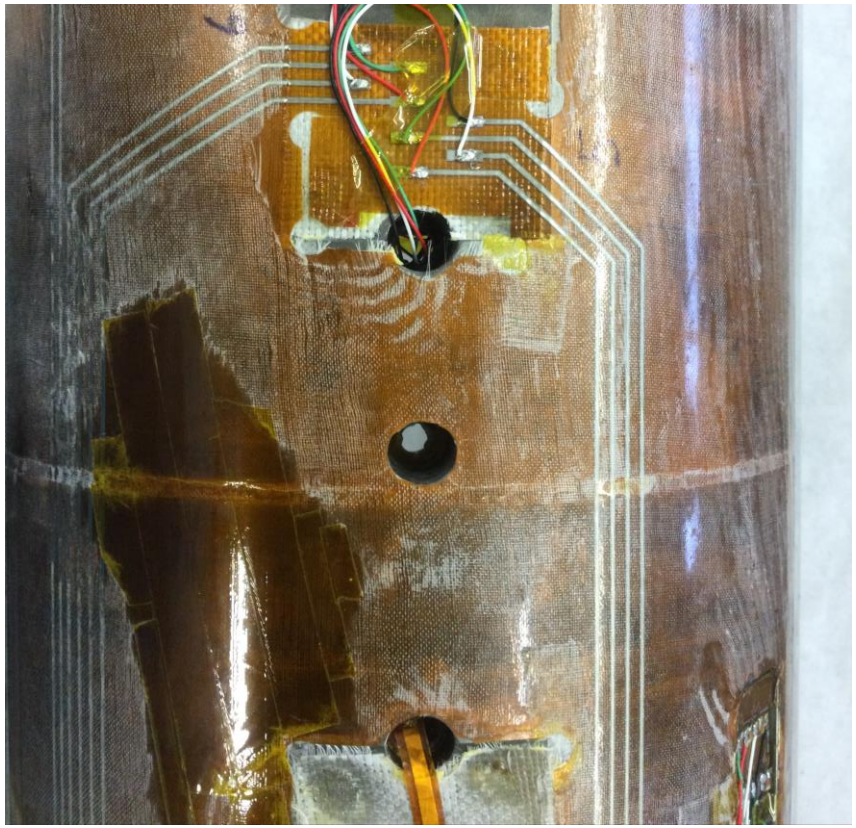
Return End

Pole split

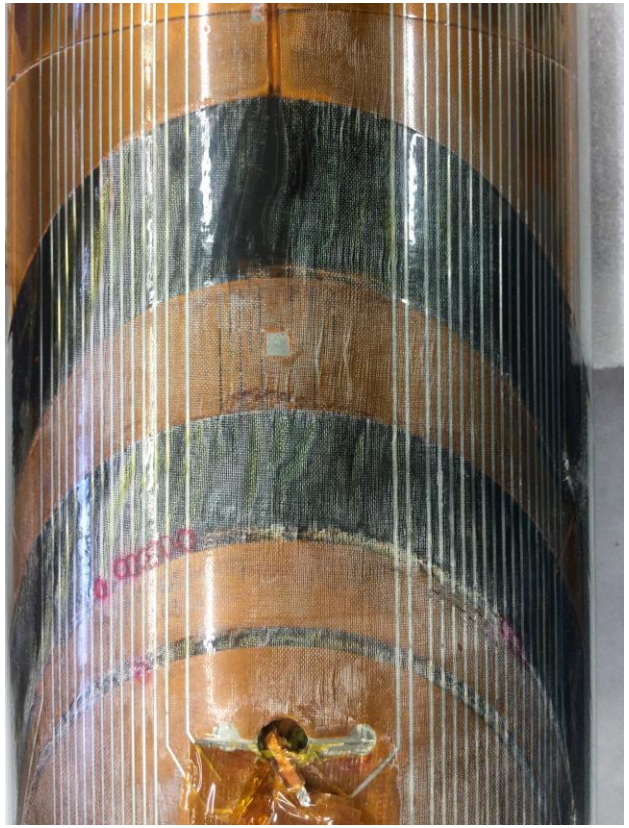
Lead End

# Outer Coil #4 – Outer Layer View after Test 2

Return End



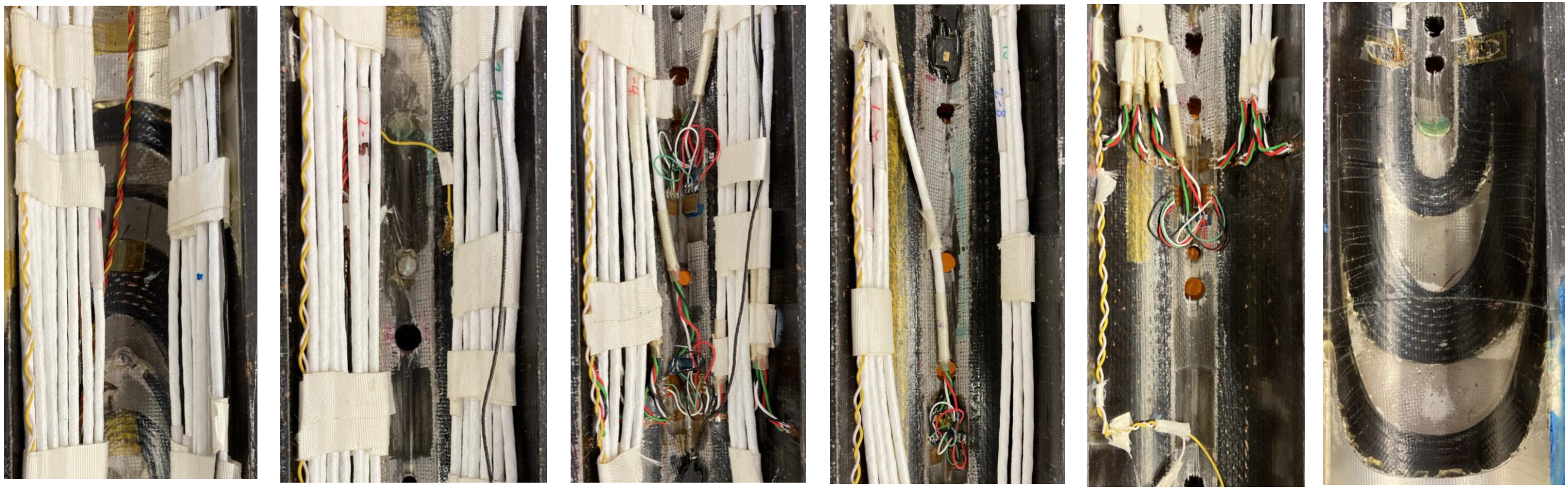
Pole split



Lead End

# Inner Coil #2 - Inner Layer View after Test 2

LE



RE

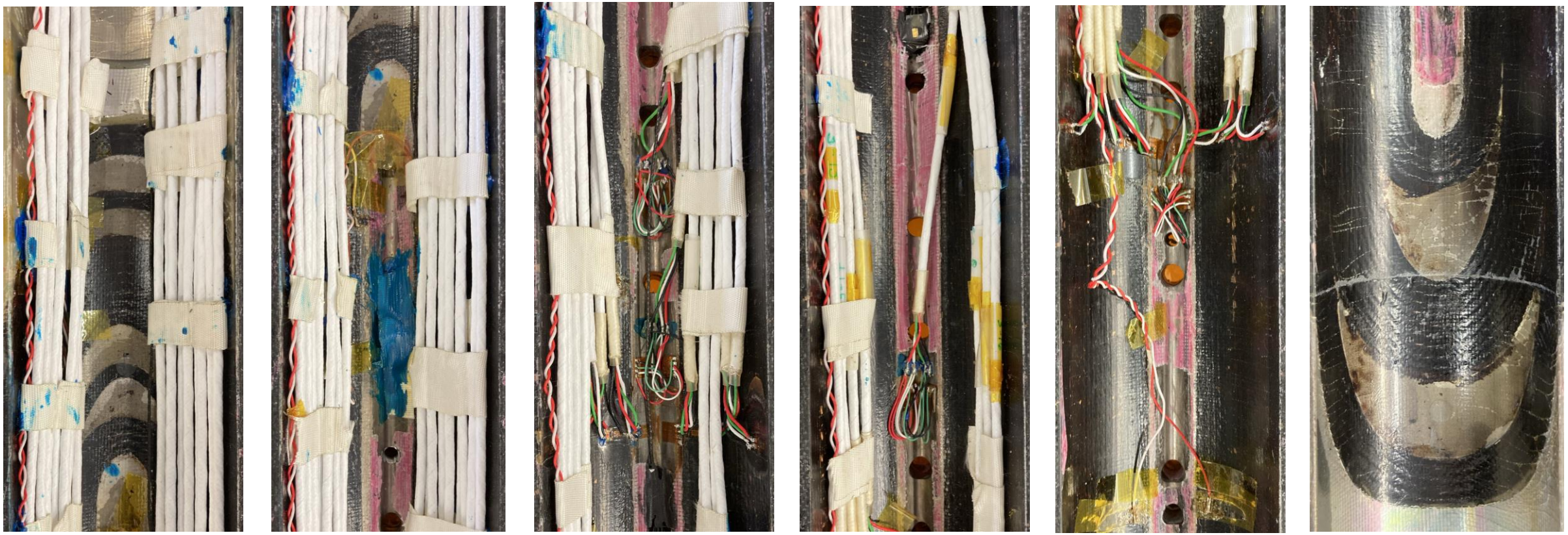
# Inner Coil #2 - Outer Layer View after Test 2

LE


RE

# Inner Coil #3 - Inner Layer View after Test 2

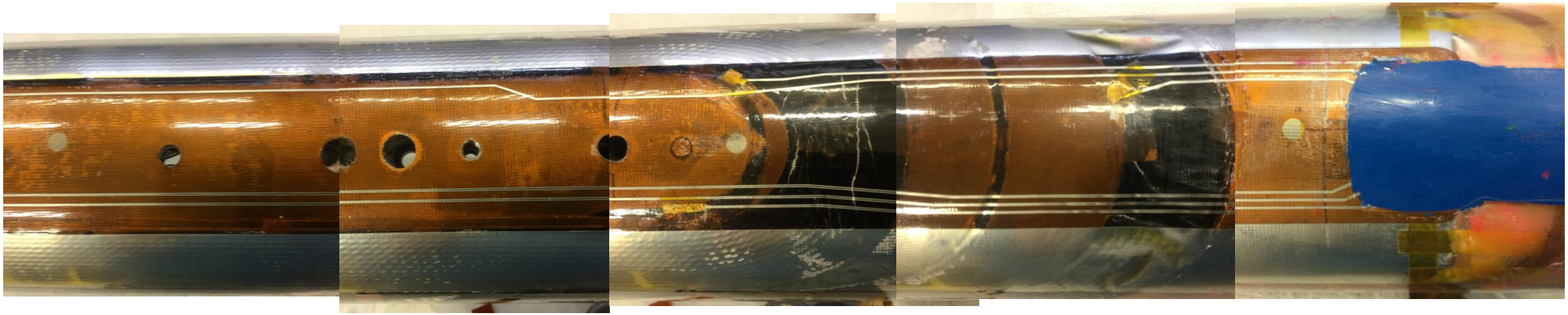
LE

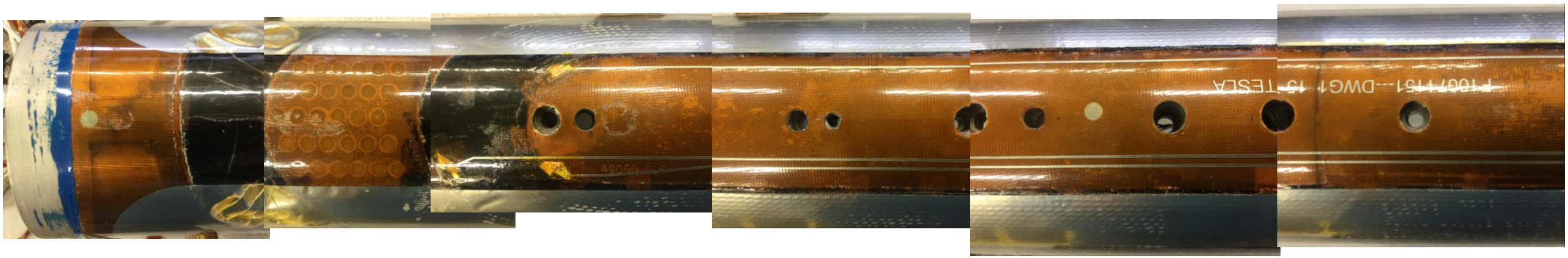


RE

# Inner Coil #3 - Outer Layer View after Test 2

LE





RE

# Summary and Next Step

- MDPCT1b disassembly completed as planed
  - new magnet structure worked as expected
- All structural parts (skin, iron laminations, AL clamps, end plates, rods) inspected,
  - no visual damage observed
- Coil block shimming corresponds to the assembly plan
  - TF shift needs further investigation
- A visual inspection of the outer coils (4 and 5) and inner coils (2 and 3) completed
  - all surface cracks relate to a relative motion of the coil parts

Next steps

- Coil SG's reading
- Coil size measurements
- Data analysis