ISABEL NARANJO DE CANDIDO

FERMILAB SUMMER STUDENTS 2016

WHO I AM

- Isabel Naranjo De Candido
- Born in Marostica (VI), 29/09/1993
- Resident in Padua
- Master Degree in Nuclear Engineering, University of Pisa

IARC

- **Mission**: To partner with industry to exploit technology developed in the pursuit of science to create the next generation of industrial accelerators, products, and new applications

- **Vision**: To be the preeminent technology source for accelerator based products and services, serving as the seed for US industrial growth

SRF COMPACT ACCELERATOR

- Industrial accelerators must be cost-effective, simple, versatile, efficient, and robust
- Accelerator technology developed for science can be applied to industrial, medical and security applications
- Recent advances in multiple Superconducting Radio Frequency (SRF) technologies allow for the design of a novel compact, portable, high average power electron linac

SRF CAVITIES COOLING

- Avoiding liquid He cooling would be of great importance for portable applications
- New SRF cavities coated with Nb_3Sn are more efficient and should allow the substitution of liquid cooling with thermal conduction cooling through high purity Al connected to a cryocooler

PROJECT WORK PLAN

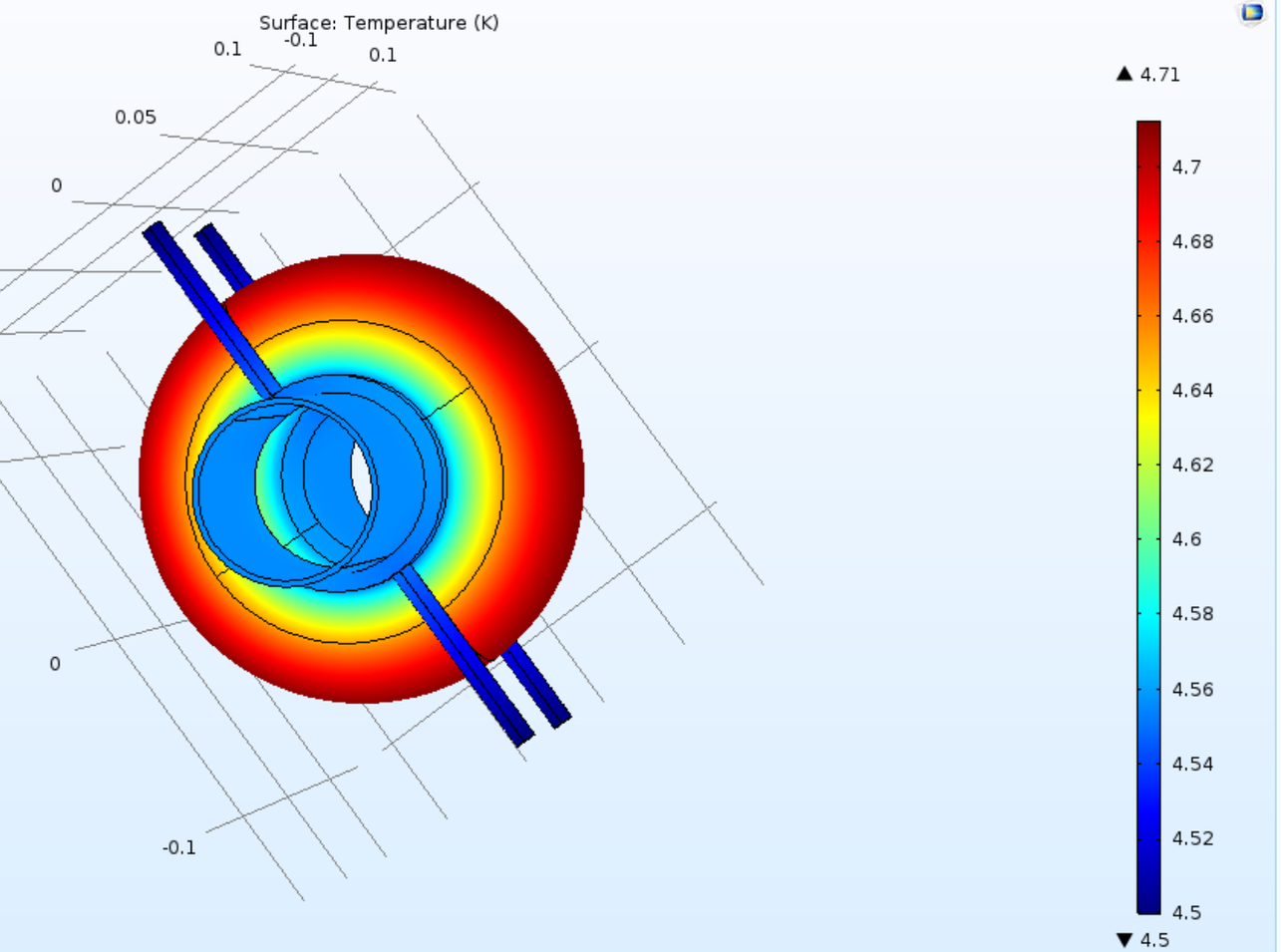
FIRST TEST OF CONDUCTION COOLED SRF CAVITY

PROJECT WORK PLAN

- Bring an existing 1 Watt cryocooler from IB1 to IARC
- Run the cryocooler with a 1.3 GHz single cell Nb cavity equipped with a resistor to measure the cryocooler capacity at ~4.5 K
- Test a single cell 1.3 GHz pure Nb cavity excited with RF
- When the techniques are optimized, replace the pure Nb cavity with a Nb_3Sn coated cavity

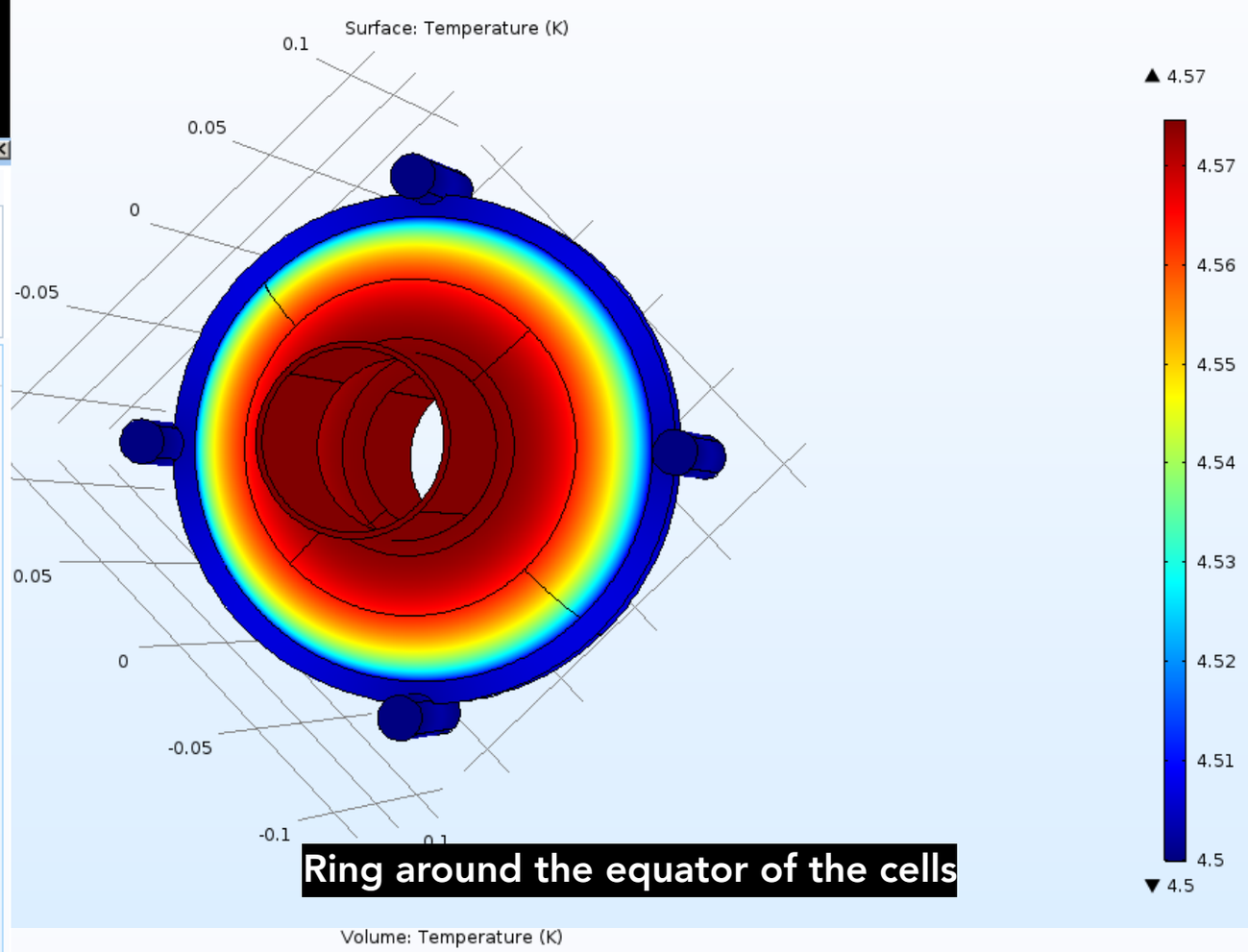
_4.mph - COMSOL Multiphysics

Second Point for Cut Plane Normal
Cut Plane Normal
Cut Plane Normal from Surface
3D Image
Animation
Export

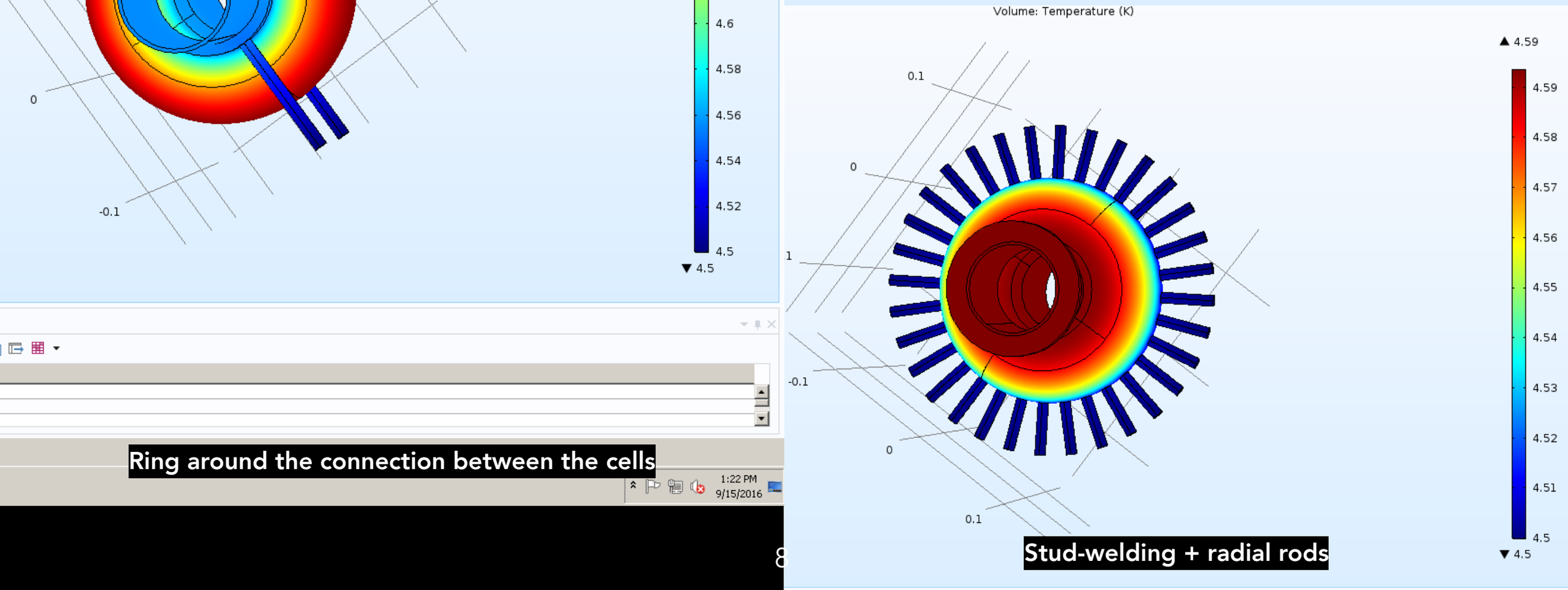


Ring around the connection between the cells

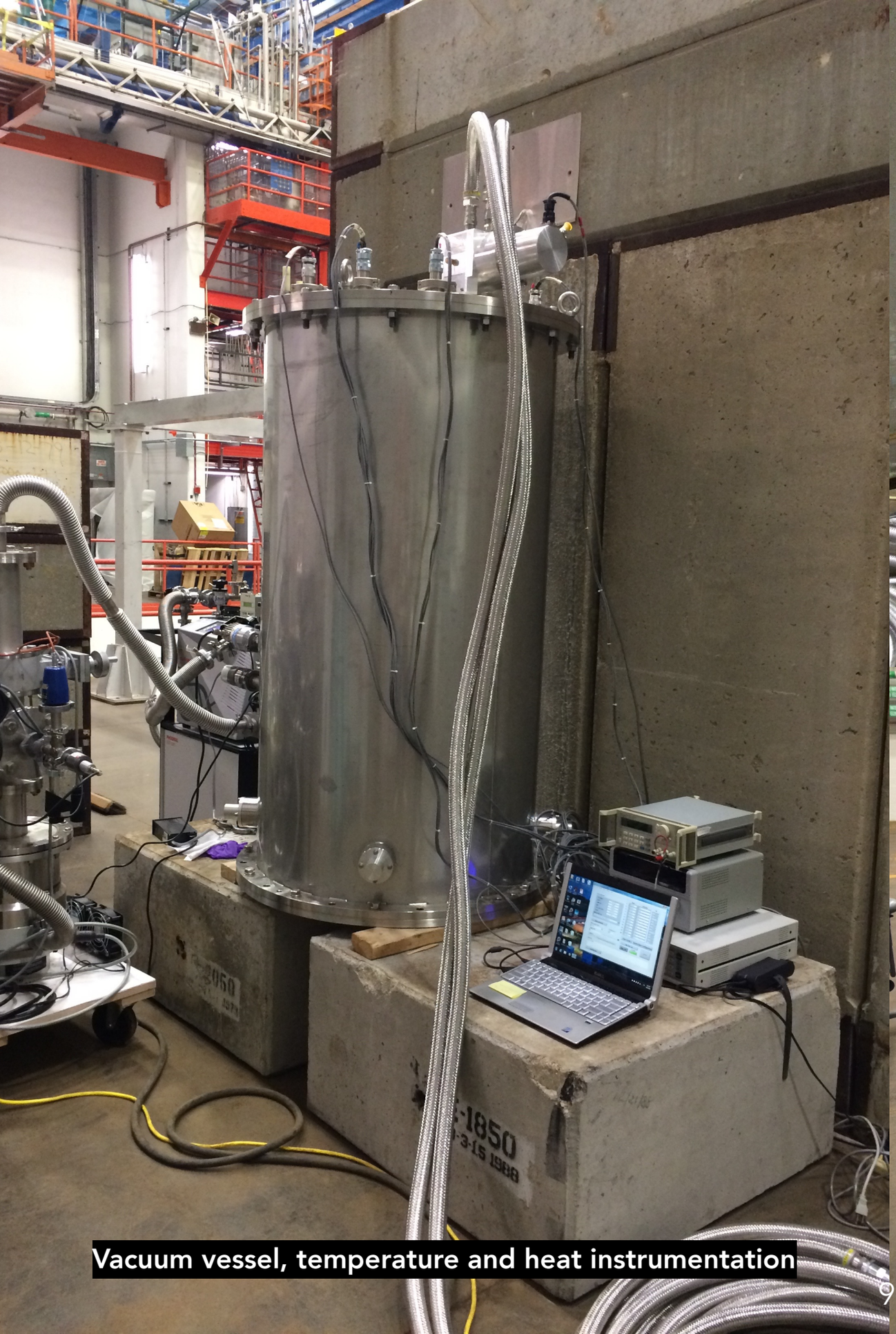
1:22 PM
9/15/2016



Ring around the equator of the cells

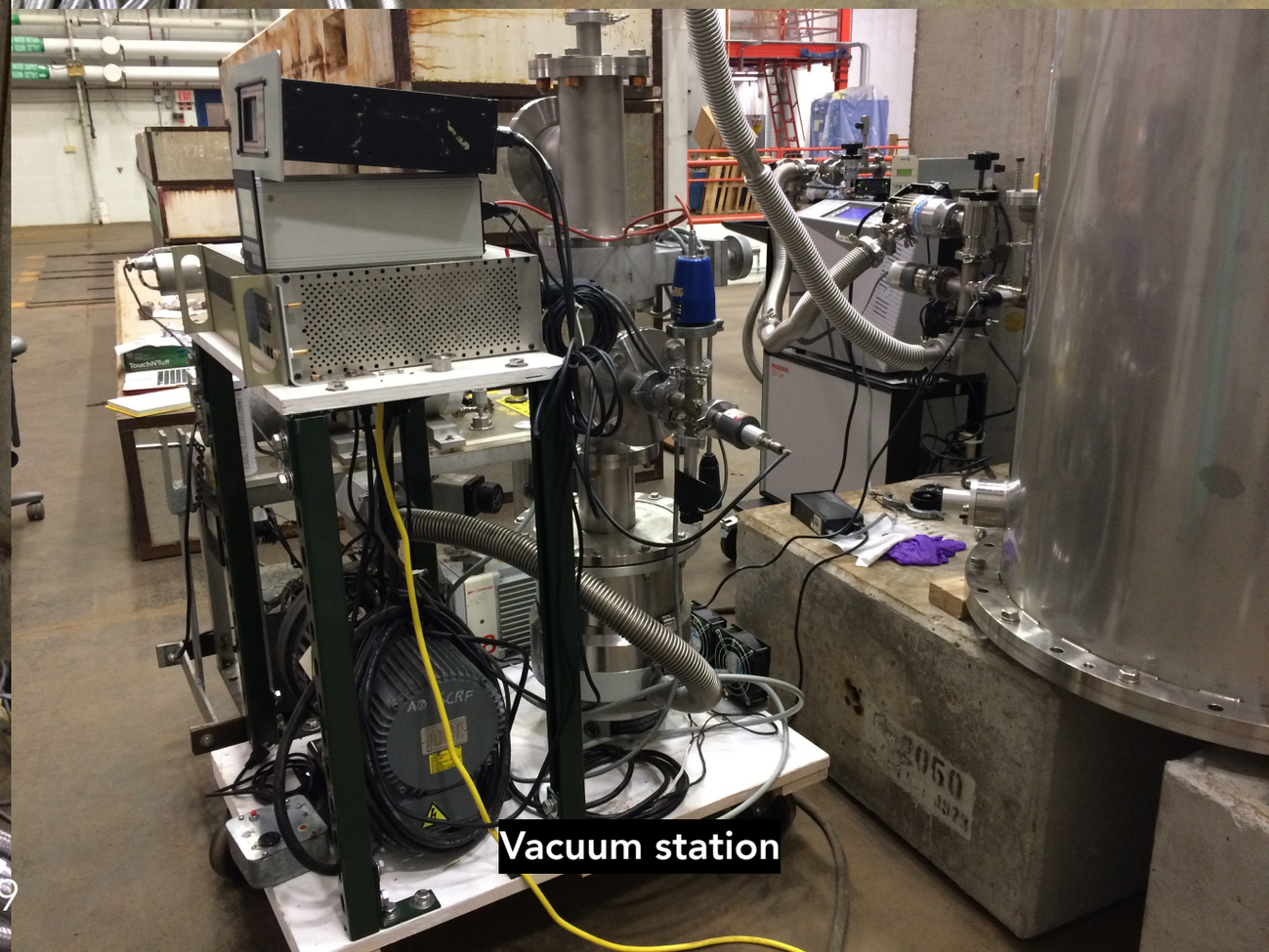


Stud-welding + radial rods



Vacuum vessel, temperature and heat instrumentation

Compressor and chiller

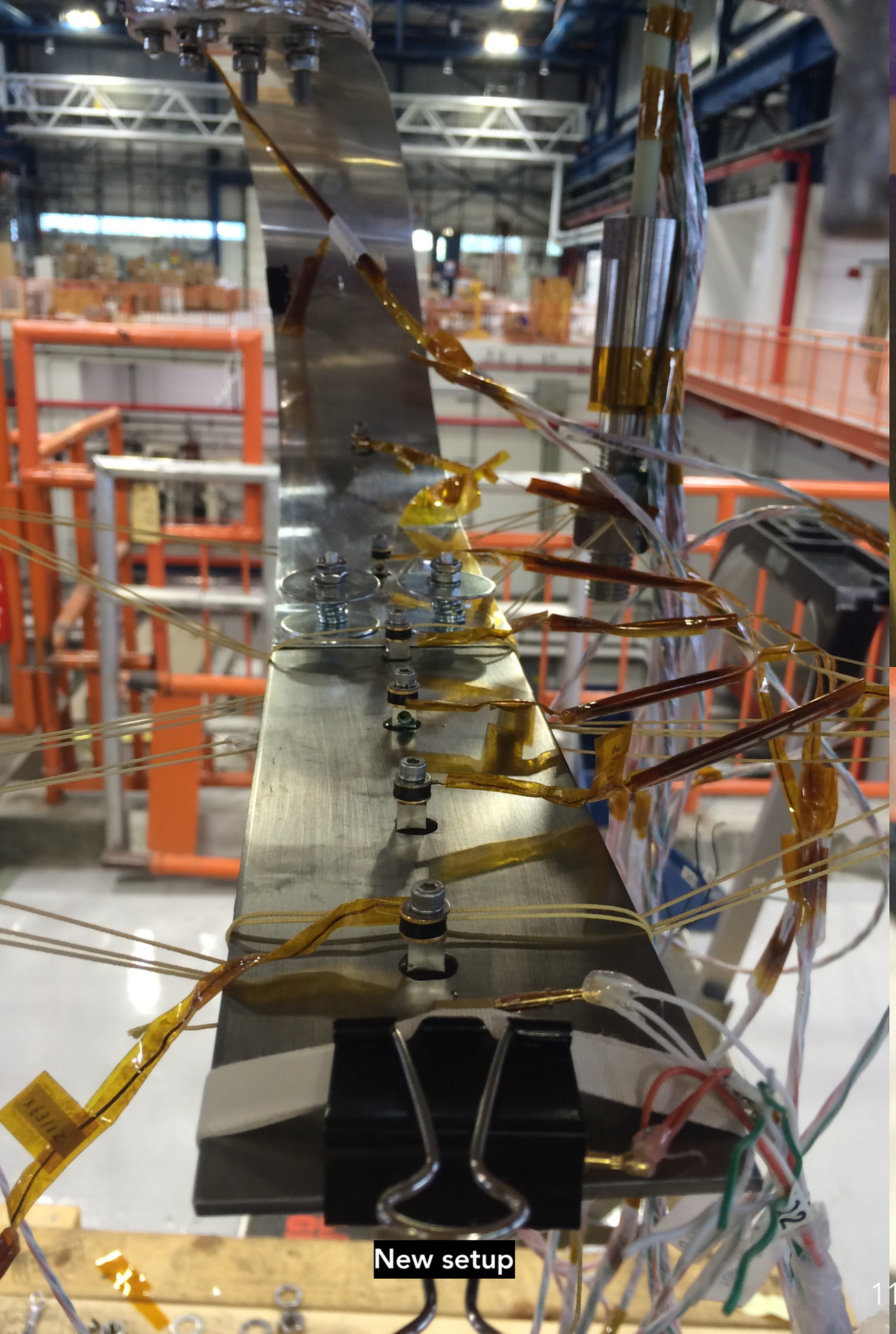


Vacuum station

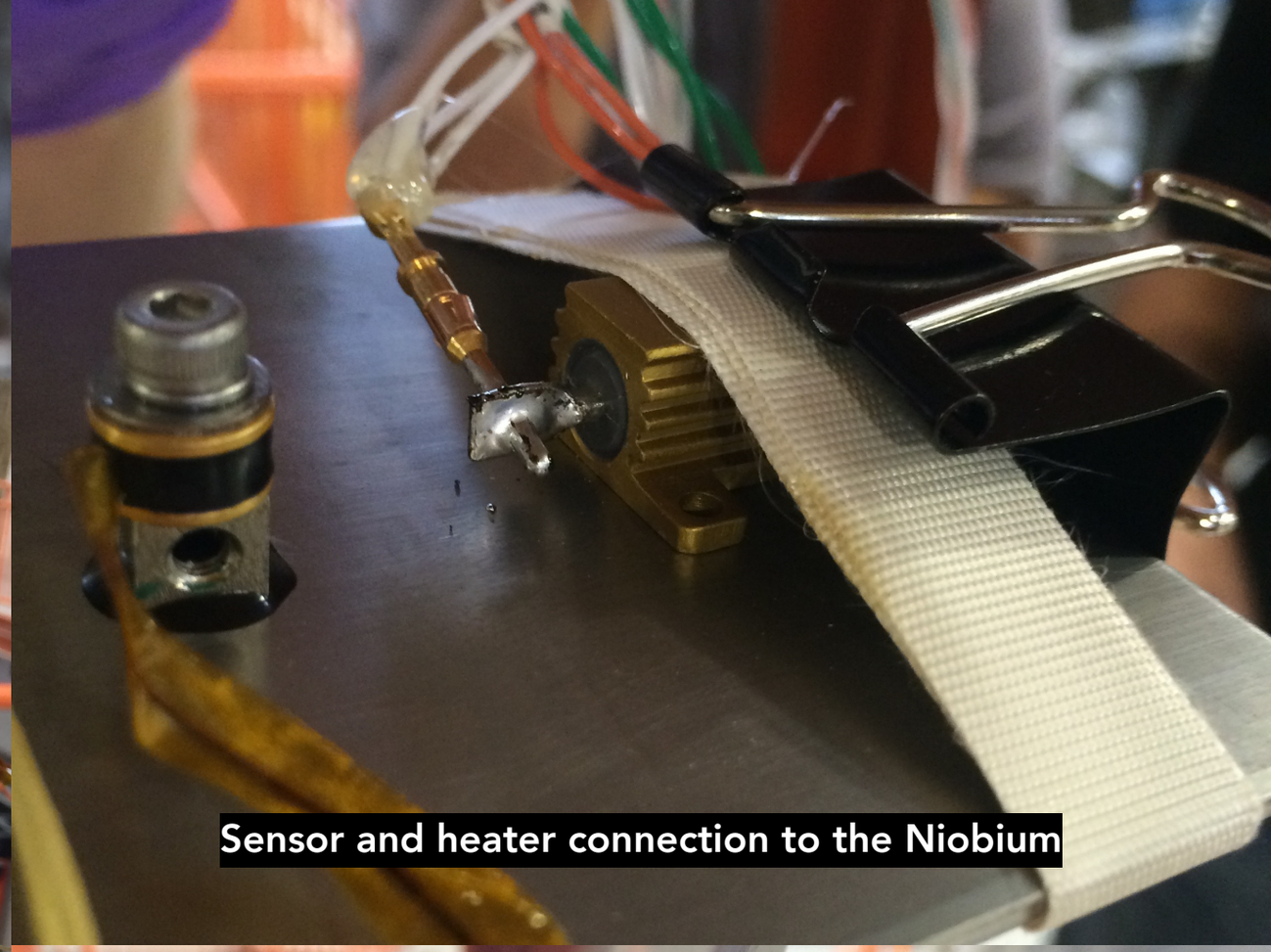
New MLI around the radiation shield

Radiation shield closing

MLI and Indium washer



New setup



Sensor and heater connection to the Niobium

1st sensor on Aluminum clipped

KNOWLEDGE ACQUIRED

- COMSOL
- Superconductivity
- SRF cavities
- Material science and technology
- Cryogenics
- Vacuum
- Sensors technology
- Hands-on work
- Safety
- Timing

ITALIANS AT FERMILAB


Hard Rock
CAFE
CHICAGO


ZZ TOP

THANK YOU FOR THE ATTENTION!