



# **Electro-magnetic force at coil end and countermeasures to cable displacement**

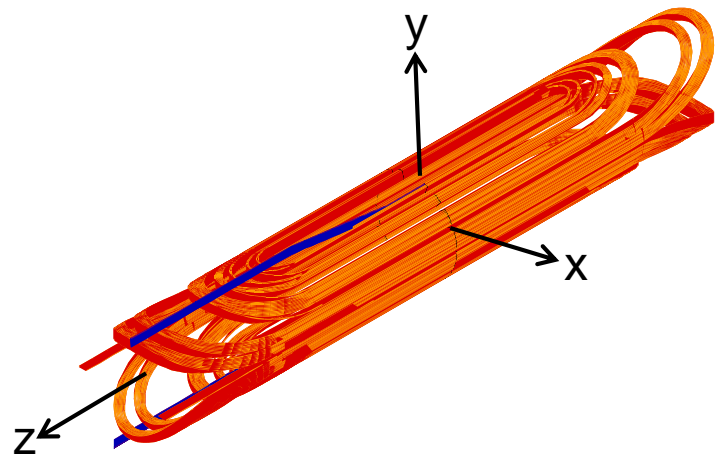
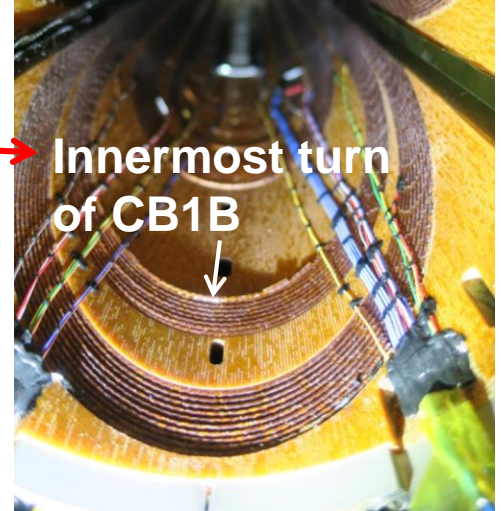
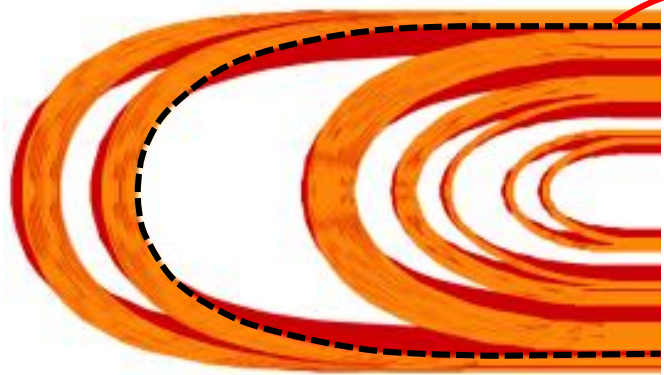
**Michinaka Sugano**

**KEK**

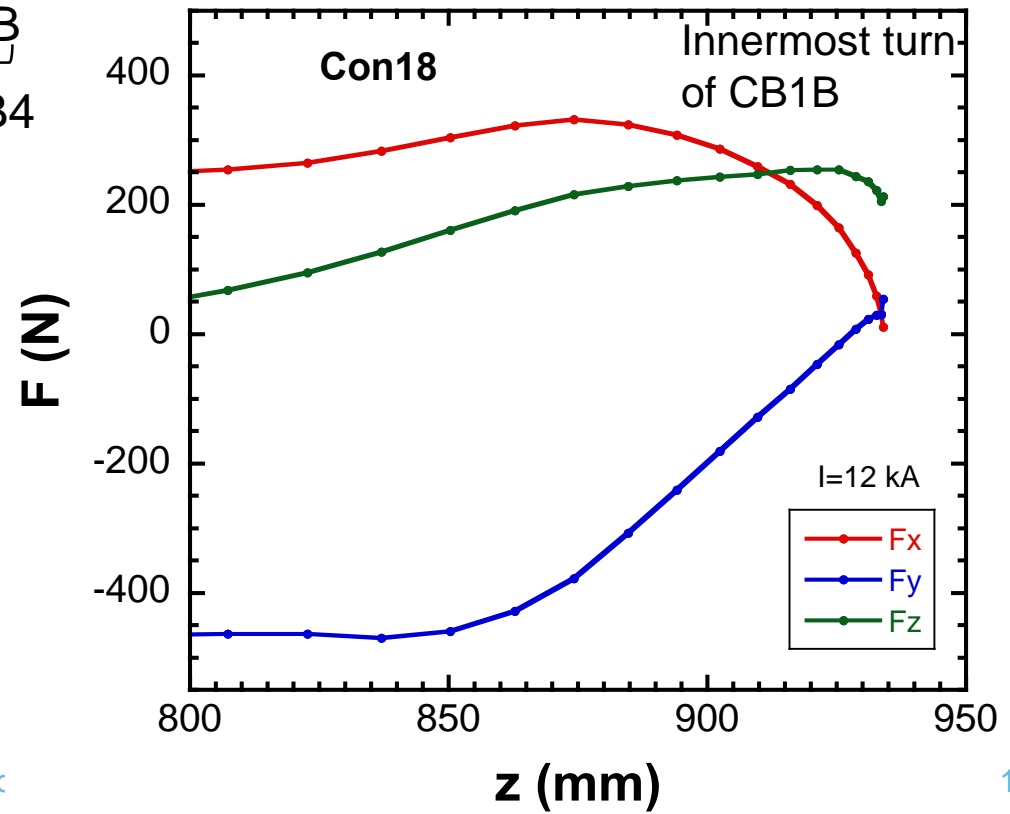
**On behalf of CERN-KEK Collaboration for  
D1 development for HL-LHC**

International review on D1 Superconducting  
magnets for HL-LHC, 11-13 March, 2019

# Lorentz force acting on a cable



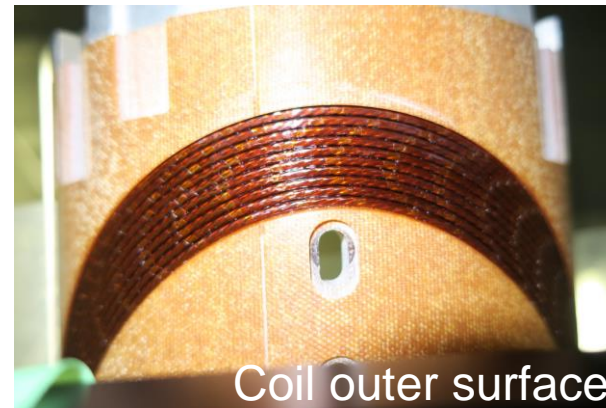
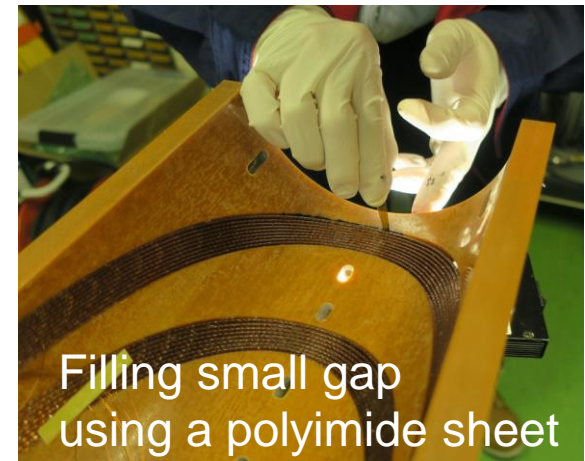
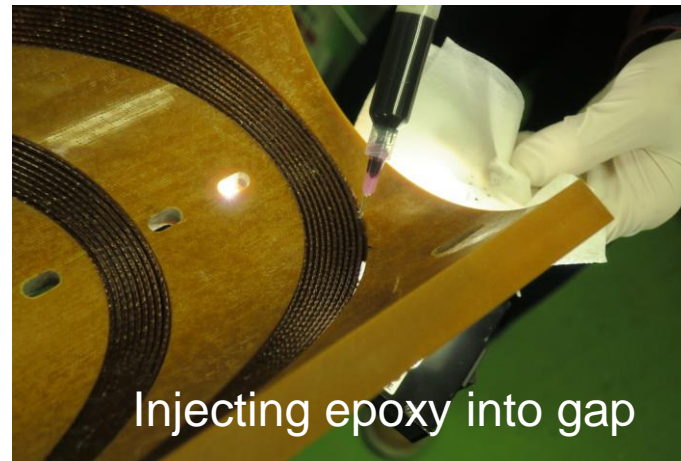
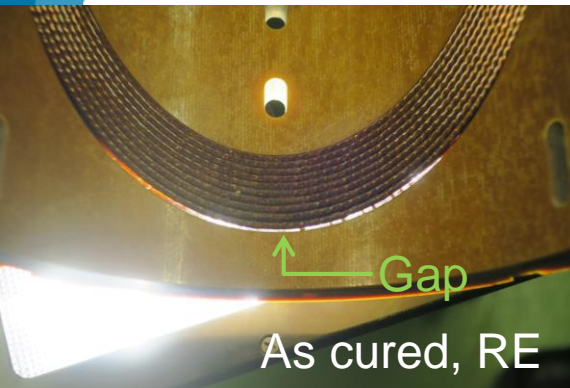
ROXIE 3D calculation for MBXFS1b



# Countermeasures to cable displacement applied to MBXFS3

- Increase in azimuthal coil pre-stress by inserting shims into coil MP
- Increase in axial pre-load
- Improving fitting between spacer and cable

# Filling a gap for better fitting btw spacer and cable in MBXFS3



- To transmit pre-stress to coils effectively, a small gap between end spacer and cable was filled with epoxy resin after curing.
- Epoxy: Stycast 2850FTJ + Catalyst 9M, mixed and cured at RT
- Epoxy resin was injected into a gap. Viscosity of the resin was appropriate to fill a small gap but not to leak to the coil outer surface.
- For a prototype, we need to find new radiation hard resin for this work.