

# Hands-on-training

Superconducting Magnet

Yasuhiro MAKIDA (KEK)

# Let's Play Superconducting Coaster

---

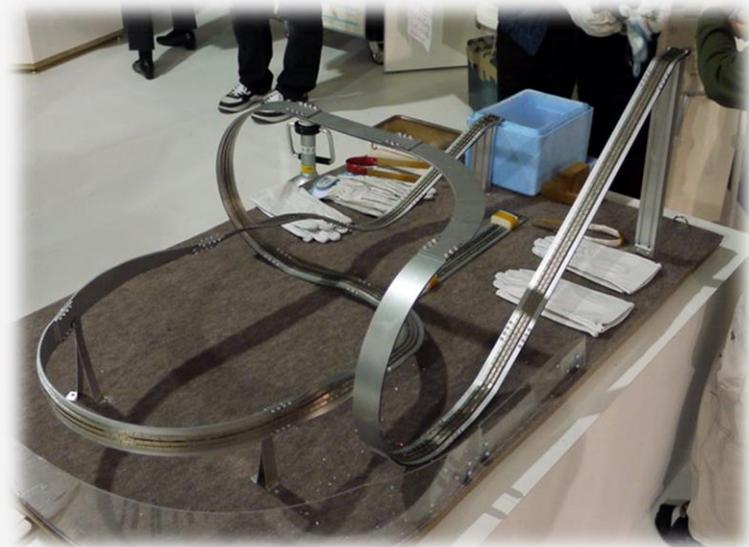
When your laboratory joins some public events, for example open-houses or university festivals, how do you attract the interest of the visitors to your cryogenic or superconductive researches.

Superconducting Coaster is one of the efficient exhibition due to its dynamic movement.

There are a lot of superconducting coasters in many laboratories, which needs guide rail ways composed with large number of neodymium magnet pieces aligned. And this preparation takes long time.

Today, we are going to create and play superconducting coasters with a simple guide rail way by using commercial available rubber magnetic belt and light coasters made of ReBCCO tape conductor.

Enjoy it.



[https://www.youtube.com/watch?v=fyWfEKTGXgo&ab\\_channel=KEK%E3%83%81%E3%83%A3%E3%83%B3%E3%83%8D%E3%83%AB](https://www.youtube.com/watch?v=fyWfEKTGXgo&ab_channel=KEK%E3%83%81%E3%83%A3%E3%83%B3%E3%83%8D%E3%83%AB)



[https://www.youtube.com/watch?v=uKnUCz8pads&ab\\_channel=lthacaCollegePhysics](https://www.youtube.com/watch?v=uKnUCz8pads&ab_channel=lthacaCollegePhysics)

# Materials for this Hand-on-training

- ReBCCO Superconducting Tape by FUJIKURA, FYSC-SCH12

**$I_c$  : >550 A at 77 K**

Copper Stabilizer Coating 20  $\mu\text{m}$

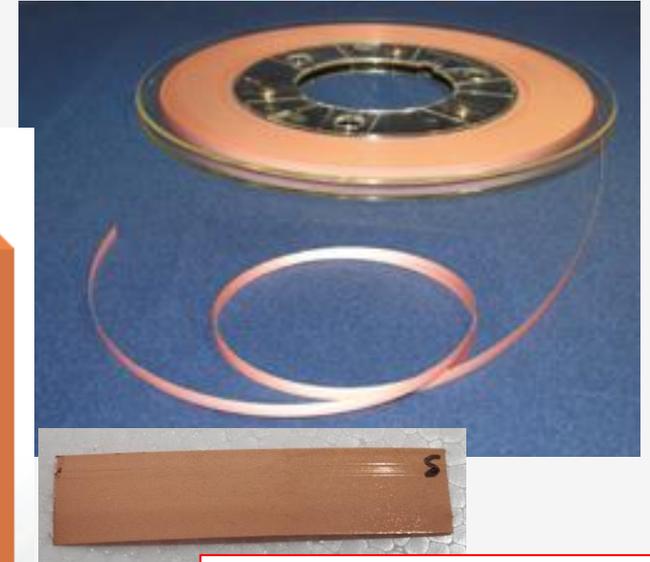
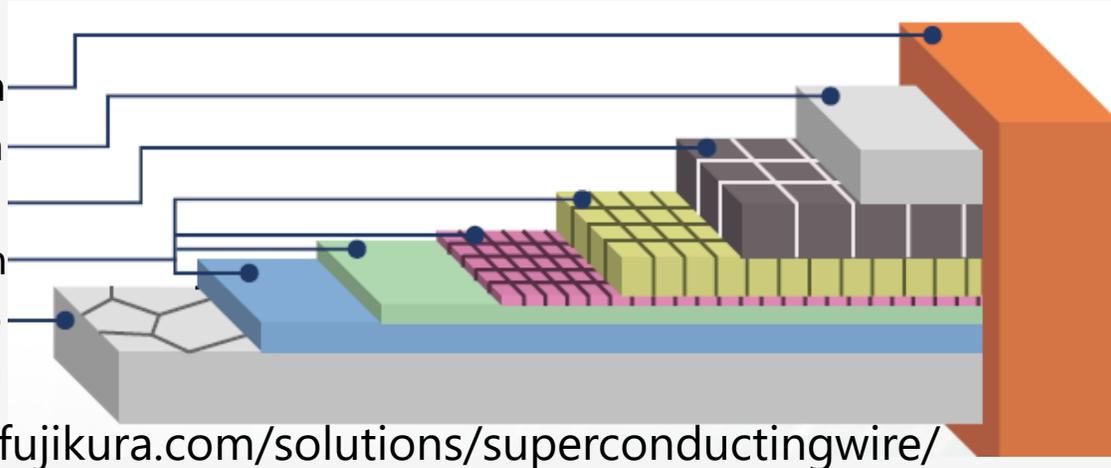
Silver Protection 2  $\mu\text{m}$

**Superconductor [GdBCO] 2  $\mu\text{m}$**

Middle layer [MgO, etc.]  $\sim 0.7\mu\text{m}$

Metal substrate

[Hastelloy®] 75 $\mu\text{m}$

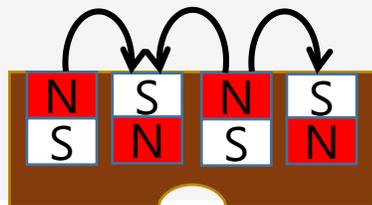


**"S" is marked SC side**

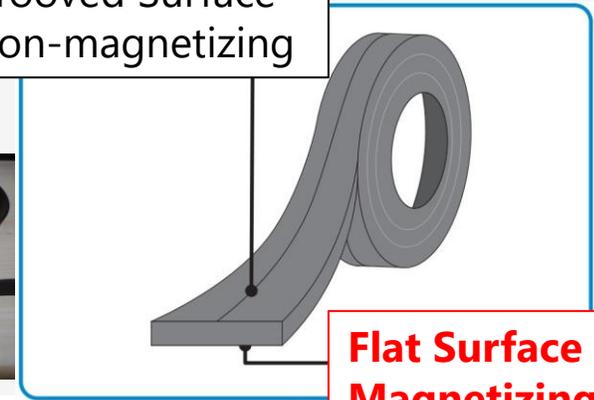
- Anisotropic Rubber Magnet Belt by MagX,

Strontium Ferrite Particle Powder 0.24

<https://www.magx.co.jp/product/magnetsheet/>



Grooved Surface  
Non-magnetizing



**Flat Surface  
Magnetizing**

# Superconducting Coaster Mechanism

Why ReBCCO tape can float on and be guided by the magnetic way ?

Key word : Hard(Dirty) Type II Superconductor, Pinning, Magnetization

