

# Discussion Topics

- ◎ SX beam simulations and codes
- ◎ Super cycle stability (CERN, BNL)
  - eddy current
  - remanent (hysteresis)
  - magnetic aftereffect
- ◎ Why is HIT's beam spill perfect ( a  $50\mu\text{s}$  (20kHz) resolution)  
bunching, RF-KO, power supply ripple, (BTF)?
- ◎ RF manipulations for debunching
  - phase jump, bunch rotation, 2 step debunch (+phase offset injection)
- ◎ energy deposit and damage in ESS blade
- ◎ ESS sparks
- ◎ debunch instability

# For realistic spill simulations

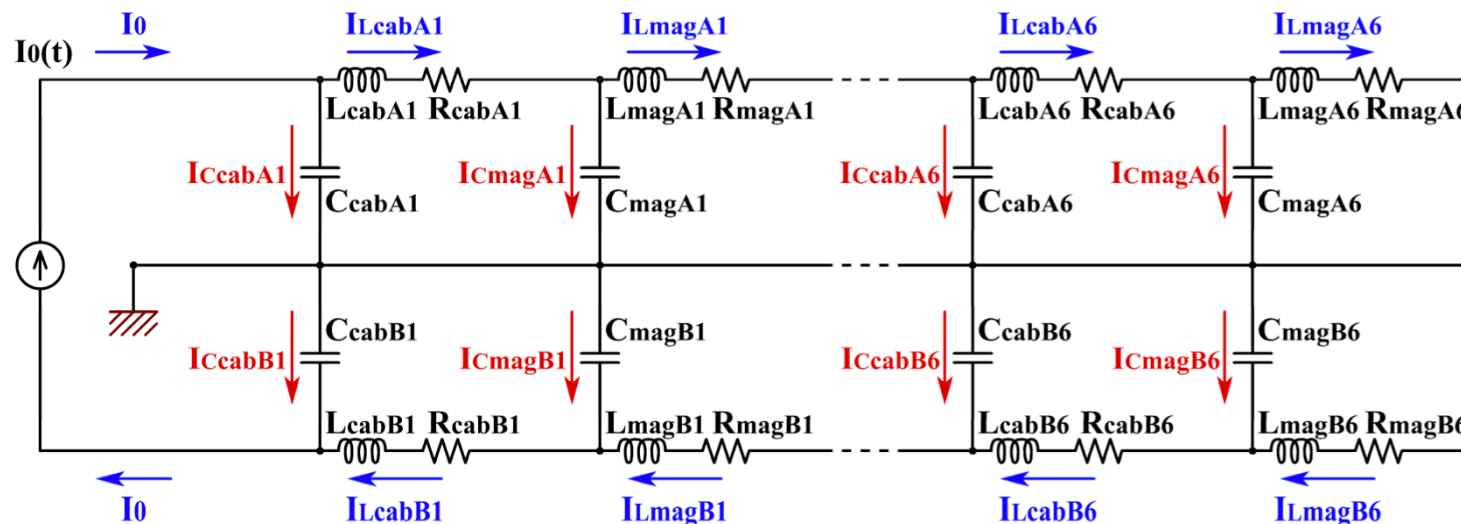


Figure 5: Schematic circuit of the J-PARC MR QFN magnets. In the simulation, the 48 magnet units are divided into six groups. The cables are also grouped into six bunches of loads.

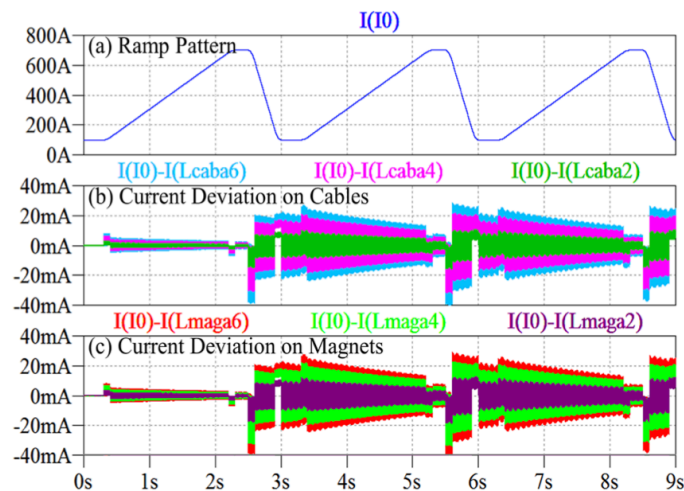


Figure 6: Simulated results for the J-PARC MR QFN magnet family with the cable connections.

- [1] Y. Shirakabe, et al., "Study of Transient Ripple in Synchrotron," IEEE Transactions on Nuclear Science, vol. 61, Issue 5, Part 2, Oct. 2014, pp. 2579-2587. <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6895313>
- [2] Y. Shirakabe, et al., "Study of Transient Ripple in Synchrotron - Practical Applications," *ibid.*, pp. 2588-2594. <http://ieeexplore.ieee.org/xpl/articleDetails.jsp?arnumber=6895320>