**MT29 Abstracts and Technical Program** 



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## Sat-Af-Mem1-02: Electromagnetic Behaviors and Magnetic Instability of Robust REBCO Coils with Edge-impregnation

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We have proposed "Robust REBCO coil" concept for high field cryogen-free superconducting magnet (CSM), which consists of two REBCO tapes co-winding and edge-impregnation. It is expected that the two tapes co-winding in direct electric contact can reduce the risk of burn-out coming from local degradations and the edge-impregnation reduce the maximum hoop stress [1-3]. From an electromagnetic point of view, the effect of coupling currents developing within the two-tape bundle, in addition to the screening currents, should be considered. In fact, the screening and the coupling currents are causing an error in the magnetic field. These two currents have an opposite effect on the magnetic field error [4, 5].

In addition, we observed magnetic field instability over a large-scale prototype of a HTS coil with the "Robust REBCO coil" concept when it operates at a temperature lower than 20 K. We assume that this instability is coming from the screening and the coupling currents. We have often observed many spikes in the coil voltage signals, usually considered coming from wire movements. However, in addition of these spikes, we observed over transient voltage, that we assumed to be of different origin related to a magnetic instability. In this contribution, the electromagnetic behaviors of the large-scaled prototype of the future HTS insert for the 33 T- CSM project will be discussed.

References

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