



Contribution ID: 339

Type: **Poster Presentation of 1h45m**

## **Additional AC loss properties of REBCO superconducting two-strand parallel conductors**

*Wednesday, 30 August 2017 13:15 (1h 45m)*

REBCO superconducting tapes have great performance in critical current density,  $J_c$ , property even at liquid nitrogen temperature. However, it is necessary to enhance a current capacity according to various applications. We proposed the configuration of parallel conductors. The constituent strands of parallel conductors need to be insulated and transposed for even current sharing and low ac loss. In case the transposition points deviate from the optimum ones, shielding current is induced according to the interlinkage magnetic flux of the twisted loop enclosed by the insulated strands and the contact resistances at the terminals. It produces an additional ac loss. Up to now, we have studied in the simple situation where parallel conductors are exposed to a uniform ac magnetic field. However, when parallel conductors are wound into a coil, applied magnetic field varies in space. In this study, we investigated the additional ac losses theoretically in the case that two-strand parallel conductors are located in non-uniform magnetic field. We derived theoretical expressions of the additional ac losses and discussed the dependences of them on the applied field amplitude,  $B_m$ , non-uniformity in magnetic field,  $\Delta B$ , the deviation length of the transposition point from the optimum one,  $\Delta l$ , and so on. The additional ac loss increased in proportion to the square of  $B_m$  and  $\Delta l$  when the induced shielding current,  $I_s$ , do not reach the critical current,  $I_c$ . However, in the case  $I_s$  reach  $I_c$ , the additional ac loss abruptly increased against  $B_m$ . In addition  $\Delta B$  affects the threshold criterion for  $I_s = I_c$  and also the ac loss property itself. In this conference we will report the details of the threshold criterion and ac loss properties.

### **Submitters Country**

Japan

**Primary author:** Mr OKI, Soichiro (Kyushu University)

**Co-author:** IWAKUMA, Masataka (Kyushu University)

**Presenter:** Mr OKI, Soichiro (Kyushu University)

**Session Classification:** Wed-Af-Po3.12

**Track Classification:** G4 - Losses in Conductors and Coils