

## Comparison of Reciprocal and Concentric Winding Arrangement of HTS Transformer

Sung-Hoon Kim<sup>\*</sup>, Woo-Seok Kim<sup>\*\*</sup>, Sang-Jin Lee<sup>\*\*\*</sup>, Kyeong-Dal Choi<sup>\*\*\*\*</sup>,  
Hyeong-Gil Joo<sup>\*\*\*\*</sup>, Gye-Won Hong<sup>\*\*\*\*</sup>, Jin-Ho Hahn<sup>\*\*\*\*</sup> and Song-yop Hahn<sup>\*</sup>

<sup>\*</sup>*Seoul National University, Seoul, Korea*

<sup>\*\*</sup>*Electrical Engineering and Science Research Institute, Seoul, Korea*

<sup>\*\*\*</sup>*Uiduk Univeristy, Gyongbuk, Korea*

<sup>\*\*\*\*</sup>*Graduate School of Energy, Korea Polytechnic University, Kyonggi-Do, Korea*

In high temperature superconducting (HTS) transformer with double pancake windings, the perpendicular component of leakage magnetic flux density ( $B_r$ ) applied to HTS tapes of double pancake windings of HTS transformer acts as a cause to decrease the critical current in HTS tape. So, in this paper, HTS transformer with reciprocal arrangement winding is designed. And in order to investigate the  $B_r$  applied to HTS windings, the 2-D non-linear electromagnetic analysis of HTS transformer is performed. The maximum  $B_r$  applied to winding of HTS transformer is 0.112 T and the characteristics of HTS transformer were also obtained such as the efficiency, voltage regulation, %impedance and etc. But in this type of winding arrangement, reciprocal arrangement, the generated ac-loss to the HTS windings is very high because of the applied  $B_r$  to HTS windings. Therefore, in order to reduce the ac-loss of HTS winding, the new design of HTS transformer with concentric winding arrangement is presented in this paper and the 2-D non-linear electromagnetic analysis for HTS transformer with the new type winding is carried out.

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