



MT 26
International Conference
on Magnet Technology
Vancouver, Canada | 2019

Contribution ID: 1466

Type: **Poster Presentation**

Thu-Mo-Po4.14-03 [110]: Guidance performance of YBCO bulks below the liquid nitrogen temperature zone

Thursday, 26 September 2019 08:45 (2 hours)

High-temperature superconducting magnetic levitation (HTS Maglev) system has the intrinsic advantage of self-stabilizing suspension without external control, and has great potential to be a new type of rail transit. The HTS bulks are core component of the the HTS Maglev train. Many experiments show that the levitation performance of superconducting bulks have been significantly improved when the temperature below the liquid nitrogen temperature zone, however, there is no research about guidance performance of multiple bulks at temperatures below 77 K. Therefore, it is necessary to investigate the guidance performance of multiple bulks at temperatures below 77 K. A low temperature experimental platform was set up based on SCML-1[1]. By this system, measurements of guidance force versus temperature and guidance force versus field cooling heights (FCHs) and working heights (WHs) can be performed at temperatures from 50 K to 92 K. According to the experimental data, the most suitable FCH and WH at different temperatures and the lowest cost can be found between the consumption of the bulks and the cryogenic system when designing the HTS Maglev cryogenic system. The results are important for the engineering application of the HTS Maglev train.

Keywords: high temperature superconductor, low temperature, guidance force, refrigerator.

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Session Classification: Thu-Mo-Po4.14 - Levitation and Magnetic Bearings IV