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Experimental Investigations on Power frequency Electrical Breakdown Characteristics of Liquid Nitrogen for HTS power devices

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Content :

Recent developments in High Tc Superconducting (HTS) materials are encouraging the development of HTS based power devices which can operate at temperatures around 77 K. Due to the cheaper cost and abundant availability, many of the HTS based power devices i.e. HTS Cables, HTS Transformers, HTS Fault Current Limiters and HTS Motors are designed considering Liquid Nitrogen (LN₂) as the cryogen. The LN₂ serves as cryogen for cooling the HTS tapes and also acts as good insulating material for High voltage operations. The Electrical Breakdown characteristics of LN₂ are one of the essential parameters for designing the HTS based power devices. In the present work, to evaluate the breakdown strength of LN₂ at power frequency (50 Hz), a test setup was designed and developed for characterizing the power frequency breakdown strength of LN₂ at atmospheric pressure using standard test procedures and the results are presented.

Primary authors : Mr. MURALIDHAR BATHULA, VAS (Corporate R & D, BHEL, Vikasnagar, Hyderabad - 500093, India)

Co-authors : Dr. SUDHEER, T. (1Applied Superconductivity Laboratory, Cryogenic Engineering Centre, Indian Institute of Technology, Kharagpur) ; Dr. CHAWDHURY, UK (Corporate R & D, BHEL, Vikasnagar, Hyderabad - 500093, India) ; Prof. RAO, V.V. (1Applied Superconductivity Laboratory, Cryogenic Engineering Centre, Indian Institute of Technology, Kharagpur)

Presenter : Mr. MURALIDHAR BATHULA, VAS (Corporate R & D, BHEL, Vikasnagar, Hyderabad - 500093, India)

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