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Thu-Mo-PL5-01: Advances in Superconducting Rotating Machinery

Thursday, 26 September 2019 08:00 (45 minutes)

In 1973 A.D. Appleton writing in the Journal Philosophical Transactions of the Royal Society in London heralded the dawn of a new age of electrical machines with the title “Superconducting Machines – a new era for the electrical power industry. This was written in the very early days of the development of Niobium Titanium and records that the world’s very first superconducting machine was a 37 kW machine built in 1966 at IRD and that a further machine rated at 2.4 MW had already been built. The paper predicts that a 500 MW machine would weigh 210 tonnes just over half of the 400 Tonnes of a conventional machine. An even larger machine at 1300 MW would have an even greater weight saving. Since then the technology has moved on, machines have been designed and built with better and better efficiencies, materials and methods have been discovered and developed. Crucially there is a very real need now for lightweight highly efficient machines. For generation, wind turbines are being developed in the MW class. For propulsion motors are being developed aimed at providing greater than 20 kW/Kg which would enable the development of wide bodied electric aircraft. This talk will report on the current state of the art in superconducting rotating machinery and the prospects for the future.

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