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

Contribution ID: **1114** Type: **Poster Presentation**

Thu-Mo-Po4.06-04 [42]: Comparison of Electromagnetic Performance of 10-MW HTS Double-Stator Flux Modulation Generators With Different Topologies for Offshore Direct-Drive Wind Turbines

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

Offshore wind power, as a clean and renewable energy, has become the main growth point of wind power development. It is a trend, for offshore wind power, that large power even above 10 MW wind generators are preferred to reduce the cost per MW. Due to the advantage of much higher magnetic loading in the high temperature superconducting (HTS) machine compared to that of the regular machines, HTS wind generator becomes a potential candidate with higher torque density and efficiency for offshore wind direct drive generator in the future.

For HTS conventional synchronous generator, the SC field windings or armature windings are rotating, which could complicate their industrial feasibility for the offshore wind generation. In order to overcome this drawback, a kind of HTS double-stator flux modulation generator (HTS-DSFMG) with stationary seal is proposed. The field and armature coils are fixed on the two stator respectively.The rotor consists of the modulation ring and its supporting structure. Besides, modular cryostat concept is adopted for this machine.

This paper compares the electromagnetic performance of 10-MW HTS double-stator flux modulation generators with three different topologies, i.e., iron-cored stators with both field and armature coils, iron-cored stator with filed windings and air-cored stator with armature windings, and air-cored stator with filed windings and iron-cored stator with armature windings. In addition, the system comparison of HTS-DSFMG with conventional synchronous machine is conducted. The objective is to intensive study the advantages and disadvantages of HTS-DSFMG with different topologies, and to establish some design guidelines for HTS double-stator flux modulation generator with stationary seal.

Primary author: CHENG, Yi (Huazhong University of Science and Technology)

Co-authors: GAO, Yuting (Huazhong University of Science and Technology); ZHANG, Yuanzhi (Huazhong University of Science and Technology); Prof. QU, Ronghai (Huazhong University of Science and Technology); WANG, Qian (Huazhong University of Science and Technology)

Presenters: CHENG, Yi (Huazhong University of Science and Technology); GAO, Yuting (Huazhong University of Science and Technology); ZHANG, Yuanzhi (Huazhong University of Science and Technology); WANG, Qian (Huazhong University of Science and Technology)

Session Classification: Thu-Mo-Po4.06 - Wind, Wave, Tidal Generators II