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

Contribution ID: **1059** Type: **Poster Presentation**

Mon-Af-Po1.22-03 [103]: Development of a New Axial Flux Machine with the Ability of Mechanical Flux Weakening

Monday 23 September 2019 14:30 (2 hours)

Axial flux permanent magnet machines (AFPM) are being increasingly used in a great of industrial applications e.g. the electrical vehicle and wind generators, due to its very compact structure and high torque density. The single stator and single rotor configuration is the basic structure of axial flux machine. For AFPM the fractional slot concentrated winding and surface mounted PM structure is normal adopted. To increase the speed adjust range of AFPM, a new mechanical flux weakening adjuster is proposed in this paper. In additional to the traditional stator core and rotor core, the proposed new mechanical flux weakening adjuster is located on the outside of the stator core. The mechanical flux weakening adjuster can be rotated with a determined degrees, and the main magnetic flux can be adjusted. The operation principle of proposed AFPM is similar to the traditional AFPM and the only difference is the adopted mechanical flux weakening ability. Compared with the traditional flux weakening method, the inductance can be regulated as well during the main magnetic flux adjusts process in this new AFPM. As a example, when the d-axis current equals zero method is used in this machine, then the more torque can be achieved when it operates in the high speed range. In this paper, the operational principle has been explained and the power equation has been deduced for the initial dimension design. The main dimension of the machine will be optimized to achieve higher output torque and wider constant power adjust range. The main parameters and performance will be calculated by using the finite element method (FEM).

Authors: Prof. WANG, Youhua (Hebei University of technology); Mrs LU, Jiawei (Hebei University of Technology); Dr LIU, Chengcheng (Hebei University of Technology); Dr LEI, Gang (University of Technology Sydney); Prof. ZHU, Jianguo (University of Sydney)

Presenter: Dr LIU, Chengcheng (Hebei University of Technology)

Session Classification: Mon-Af-Po1.22 - Motors IV