

**Development of Permanent Magnet Synchronous Motor Driving for Superconducting
Flywheel Energy Storage System**

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We have been developing a flywheel energy storage system with superconducting magnetic bearings. The superconducting magnetic bearings consist of a superconducting magnet and superconducting bulks which are refrigerated in the same cryostat to generate stronger magnetic force. We demonstrated stable levitation of this system using flywheel test equipment with the superconducting magnetic bearings. A generator motor for driving the flywheel under ambient pressure is connected to the flywheel with a magnetic coupling to transfer the torque in a contactless manner. Therefore, the generator motor generates windage loss at all time. In this paper, we propose a large gap permanent magnet synchronous motor whose rotor is put into cryostat to reduce the windage loss.