# HTS Magnetic Bearings in Prototype Application

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***Abstract*** - ATZ Company has successfully developed high temperature superconducting (HTS) magnetic bearings for power energy application and high-speed machinery. Journal–type design and improved HTS magnetic properties increasingly fulfil industrial prototype requirements. Maximum load up to 1.1 ton, stiffnesses in 3 – 4 kN/mm level, simultaneous self – stabilization in axial and radial directions, large- gap operation of 5- 6 mm and reliable machine cooling in the 50 – 60 K region characterize the present progress of HTS magnetic bearings. A 200 mm HTS bearing of 10 kN load capacity is fabricated and integrated in a 5 kWh/250 kW flywheel energy storage system. We report about a new large gap HTS magnetic coupling system ensuring 300 mm wafer treatment inside a closed processing chamber in semiconductor industry. A linear MAGLEV transport system consisting of four modular cryostat units have been recently fabricated in a prototyping process. The four HTS cryostats can carry almost 1 ton at 10 mm magnetic gap above a magnetic guideway with a force density of about 5 N/cm². Due to perfect thermal insulation each cryostat operates more than 24 hours without refilling $LN_2$.

***Index Terms*** - HTS magnetic bearing, flywheel, MAGLEV

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