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TITLE

At the Heart of Bearingless Drive Technology

ABSTRACT

This talk presents recent advances in bearingless drive technology and highlights their expanding impact across a wide power range and diverse application domains. After a concise introduction to the principles of integrated torque generation and magnetic suspension, the talk reviews current developments in motor topologies, winding concepts, and advanced control strategies enabling compact, efficient, and highly reliable bearingless systems.

Building on these developments, the presentation introduces a new frontier application: a novel bearingless drive concept for next-generation artificial heart systems. The integration of contactless suspension and drive functionality enables compact, wear-free solutions while reducing mechanical complexity and increasing system reliability—key requirements for life-critical medical devices.

The audience will gain insight into how bearingless drive technology is moving beyond industrial applications and opening new possibilities in medical engineering, demonstrating its potential to redefine future magnetically levitated drive systems.

CV

Wolfgang Gruber received the Dipl.-Ing. (M.Sc.) degree in mechatronics and the Dr.techn. (Ph.D.) degree in technical sciences from Johannes Kepler University (JKU), Linz, Austria, in 2004 and 2009, respectively. Since 2012, he has been an Assistant Professor, since 2018 an Associate Professor, and since 2021 Full Professor with the Institute of Electrical Drives and Power Electronics, JKU. Since 2004, he has also been a Senior Researcher with the RD company Linz Center of Mechatronics GmbH (LCM), Linz, Austria. He has developed the bearingless segment motor, reluctance motor, flux-switching motor, and PM Vernier motor. His research interests include new topologies for bearingless slice motors, their design, setup, and control. Dr. Gruber is the recipient of the International Nagamori Award in 2015.

