Special Issue

Magnetic Levitation and Actuator Integration: From Fundamental Research to Emerging Applications

Message from the Guest Editors

This Special Issue focuses on the synergies between magnetic levitation (maglev) technology and actuators, exploring their integration across industrial, transportation, and aerospace domains. Maglev systems, including maglev trains, bearings, and vibration isolation platforms, rely on advanced actuators for precise levitation, propulsion, and dynamic control. We welcome contributions on actuation principles (electromagnetic, superconducting, etc.), control strategies (adaptive, robust algorithms), system design (energy efficiency, miniaturization), and emerging applications (urban mobility, high-speed machinery, biomedical devices). This Special Issue aims to bridge fundamental research and practical implementation, providing a platform for scholars and engineers to share innovations that advance maglev-actuator systems toward smarter, more sustainable technologies.

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About the Journal

Message from the Editorial Board

We are just entering the Next Wave of Technology (NWT) where actuators will play the same role as the computer chip did for computers/social media approximately four decades ago. Just in the U.S., production of $1 trillion year of electromechanical systems (vehicles, orthotics, manufacturing cells, freight trains, aircraft, etc.) will be impacted by the NWT, all driven by actuators. Five key trends can be found for the future perspectives: “Performance to Reliability”, “Hard to Soft”, “Macro to Nano”, “Homo to Hetero” and “Single to Multi functional”. We invite papers that primarily impact these economic sectors; those illustrating basic scientific principles are also welcome.

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