**Session Title**: Spacecraft Vibration and Energy Harvesting

**Introduction**:

This proposed special session aims to delve into the forefront of research and technological innovations in the domains of spacecraft vibration control and energy harvesting. As space missions grow increasingly complex and demanding, addressing the challenges of vibration mitigation and energy efficiency has become critical to ensuring the reliability, durability, and sustainability of spacecraft systems. This session will provide a platform for researchers, engineers, and industry leaders to exchange knowledge, discuss emerging trends, and present novel solutions that integrate advanced vibration control techniques with energy harvesting technologies.

The session will emphasize the development and application of state-of-the-art methodologies to mitigate the adverse effects of spacecraft vibrations while simultaneously converting vibrational energy into usable power. By fostering collaboration and knowledge-sharing, this session seeks to advance the design and operation of spacecraft systems, contributing to their enhanced performance, extended lifespan, and reduced dependency on conventional power sources.

**Topics**:

* Advanced vibration isolation and damping techniques for spacecraft
* Adaptive vibration control using smart materials
* Piezoelectric and electromagnetic energy harvesting in space environments
* Hybrid energy harvesting systems combining vibrational and thermal energy
* Flexible and miniaturized energy harvesting solutions for small satellites
* Integrated structural health monitoring and fault detection systems
* AI-based vibration data analysis for damage detection and diagnosis
* Multi-scale modeling and simulation of spacecraft vibration dynamics
* Effects of microgravity on vibration control and energy harvesting systems
* Sustainable vibration energy utilization for green space missions
* Complex spacecraft dynamics and control

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