

SPACE PROPULSION SYMPOSIUM (C4)  
Space Propulsion (8)

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PROGRESS IN REVOLUTIONARY PROPULSION PHYSICS

**Abstract**

Prior to 1988, traversable wormholes were just a science fiction notion. Prior to 1994, warp drives were just fiction. Since then, these notions have evolved into productive scientific discourse, where key issues and unknowns are raised and investigated. Through the study of these grand challenges, a better understanding of physics emerges. In 2009, the American Institute of Aeronautics and Astronautics published a peer-reviewed, expansive technical volume on these and other breakthrough propulsion visions. This paper/presentations summaries the key assertions from that 739-page volume, describing the overall state-of-the-art and the next research steps that will lead to discovering if, and how, such breakthroughs might finally be achieved. Coverage includes:

- Prerequisites for space drive physics
- Approaches to controlling gravity or inertia for propulsion
- Lessons from superconductor experiments
- Null results with "lifters"
- Implications of photon momentum in media
- Quantum vacuum physics toward power and propulsion
- Faster-than-light implications of general relativity
- Faster-than-light implications of quantum non-locality

Key Ref: Millis, Marc & Davis, Eric (eds) (2009) *Frontiers of Propulsion Science*, Volume 227 of Progress in Astronautics and Aeronautics, American Institute of Aeronautics and Astronautics.