

Abstract Submitted
for the APR18 Meeting of
The American Physical Society

Is propellantless propulsion through gravitational induction possible in general relativity? L. L. WILLIAMS, The Aerospace Corporation — We pose an engineering question as to whether propellantless propulsion via gravitational induction is allowed within general relativity. Propellantless propulsion refers to a means of propelling an object through space without ejecting a propellant of any kind. Gravitational induction refers to induced forces that appear in general relativity that accompany various states of motion. The canonical example of an induced force is the production of magnetic fields from changing electric fields, and general relativity is known to include such inductive corrections to Newtonian gravity. Therefore, propellantless propulsion through gravitational induction refers to a gravitational momentum exchange of a free object with the universe. We update previous classic results on a gravitational origin for inertia, which describe the coupling between local and distant matter, and show how large inductive forces, potentially suitable for propellantless propulsion, appear to be allowed if inertia itself is recognized as an inductive force. We invite discussion on the points (1) whether such inductive effects are allowed at all in general relativity, and if so (2) whether their magnitude is large enough to be practical compared to propellant-based propulsion technologies.

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Date submitted: 12 Mar 2018

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