

# Testing Einstein's theory: NASA Gravity Probe B mission

October 1 2004

---

As a major [NASA](#) mission begins science operations, native DeWitt Burns can make a rare claim - that **he helped test Albert [Einstein's General Theory of \[Relativity\]\(#\)](#)**.

Burns, a lifelong Athens resident and 1978 graduate of Athens High School, is a member of NASA's Gravity Probe B team. Also known as GP-B, the experiment will test Einstein's theory that space and time are slightly distorted by the presence of massive objects such as planets and stars.

As materials contamination team lead for Gravity Probe B's Materials, Processes and Manufacturing Department at NASA's Marshall Space Flight Center in Huntsville, Ala., Burns evaluated contamination-control measures to help protect the spacecraft. Also, as a member of the gas management assembly redesign team, he played a role in the design, fabrication, testing and integration of hardware that provides spin-up gas to Gravity Probe B's gyroscopes.

Gravity Probe B launched April 20 from Vandenberg Air Force Base, Calif., aboard a Boeing Delta II launch vehicle. Orbiting 400 miles above Earth, the Gravity Probe B space vehicle circles the globe every 90 minutes, crossing over both poles.

While on orbit, Gravity Probe B's four ultra-precise gyroscopes will monitor their alignment changes in relation to the mission's guide star, IM Pegasus. One of the anticipated changes is only 42 milliarcseconds

after one year, an angle so small that if someone climbed a slope of 42 milliarcseconds for 100 miles, their altitude would be only one inch higher than when they started.

These measurements will enable scientists to track two effects — how space and time are very slightly warped by the presence of the Earth, and how the Earth's rotation very slightly drags space-time around with it.

Considered among the most profound enigmas of physics, these factors have far-reaching implications for the nature of matter and the structure of the universe. Einstein proposed the General Theory of Relativity in 1916, approximately 80 years before the advent of technology capable of testing his theory.

Gravity Probe B's 12-month science-data acquisition period will be followed by a two-month post-science period for calibrations. By 2005 the Gravity Probe B mission will be complete, and a one-year period is planned for scientific analysis of the data.

Burns has a bachelor's degree in engineering from the University of Alabama in Tuscaloosa.

NASA's Gravity Probe B program is managed at the Marshall Space Flight Center. NASA's prime contractor for the mission, Stanford University in Stanford, Calif., conceived the experiment and is responsible for the design of the science instrument, as well as for mission operations and data analysis. A major subcontractor, Lockheed Martin of Sunnyvale, Calif., designed and built the spacecraft as well as portions of the science instrument.

More information about the Gravity Probe B mission is available at: <http://einstein.stanford.edu/> and <http://www.gravityprobeb.com>

Citation: Testing Einstein's theory: NASA Gravity Probe B mission (2004, October 1) retrieved 25 April 2024 from <https://phys.org/news/2004-10-einstein-theory-nasa-gravity-probe.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.