GRAVITY and the PHYSICAL UNIVERSE

The case for a radical new model and the crucial experiment by which it can be tested.

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CLOCK

ACCELEROMETER

$$G = 8\left(\frac{\rho_\mu}{\rho_N} \cdot \frac{c^2 a_0}{m_e}\right)$$

NEWTON'S CONSTANT

The most famous solution of Einstein's gravitational field equations—the Schwarzschild exterior solution—pertains to observable phenomena over the surfaces of gravitating bodies such as the Earth or Sun. Schwarzschild also derived a solution pertaining to observable phenomena *inside* gravitating bodies. While an abundance of evidence has been gathered in support of the exterior solution, the interior solution has never been tested. The interior solution based on Newton's theory of gravity has also never been tested.

In 1632 Galileo proposed a test: drop a cannon ball into a hole through the center of the "terrestrial globe." Though practically impossible to carry out on such a large scale, the experiment is easily within our technological grasp to carry out in an Earth-based laboratory or in an orbiting satellite.

Modern physics is well known to have failed in its quest to unite gravity with the other fundamental forces. Over the last few decades efforts to solve this and other fundamental problems in physics and cosmology have grown ever more unreal and extravagant. Physicists sometimes admit to being "badly stuck"; they sometimes suspect they are "missing something huge." Yet many of the efforts to get unstuck have been appraised as being so far removed from the physical world as to inspire books such as *The Trouble with Physics*, *Not Even Wrong*, *Bankrupting Physics*, and *Farewell to Reality*.

In *Gravity and the Physical Universe* it is argued that our departure from physical reality (toward excessive abstraction) is largely due to the insufficiently critical acceptance of Einstein's views on motion. For example, Einstein claimed that effects such as those caused by linear locomotion and braking or the rotational effects of a carnival ride do not indicate a "*real* acceleration" or "*real* rotation." Curiously, none of the books mentioned above dared to question the wisdom of such extreme views—views that exemplify Einstein's high regard for abstract principles and comparatively low regard for facts that are "close to experience." Herein we examine the roots of this troublesome philosophy and propose an alternative.

Einstein's theory describes gravity as an effect of curved spacetime. But neither Einstein nor anyone else has ever answered the question, what does matter *do* to cause the curvature? Physicists rarely, if ever, even *ask* this question. Finding the answer may depend on acknowledging the absoluteness, i.e., the *reality* of accelerated motion.

Accelerometers are devices designed to detect and measure acceleration. If an accelerometer gives a non-zero reading, perhaps this *ALWAYS* indicates the presence of a physically real acceleration. That is the basic strategy adopted in this book. Along this route we can begin to see *why* gravity is a manifestation of spacetime curvature. And we begin to see a variety of other interrelationships concerning light, time, space, and matter—deep connections that extend to the cosmos as a whole.

The resulting new hypothesis is called the *Space Generation Model*. Its fate hinges on the result of Galileo's experiment, whose essence is to observe the gravitational behavior of two undisturbed material bodies. What exactly happens when one body falls *without collision* into a hole through the center of another?

Huge machines like the *Large Hadron Collider* are designed for looking in small places; the tiniest bits of matter are smashed to smithereens with enormous energies. Great effort is taken to ferret out rare effects buried in the debris. If physicists were not so preoccupied with such activities and would look instead in *large* places where they have not yet looked (to find the "huge thing" they are missing) perhaps they would not be so stuck. In any case, the science of physics is long overdue to finally carry out Galileo's experiment, to discover how ordinary matter moves when simply left to itself, and whose apparatus may be characterized as a *Small Low-Energy Non-Collider*.

SMALL LOW-ENERGY NON-COLLIDER

"[If the prediction of the Space Generation Model is right] the interior solution experiment has a good chance of turning the physics community on their ear." — Dr. David Halliday, Jr.