Abstract

Accelerometer Experiments Prove and Clarify Einstein's Gravity Theory
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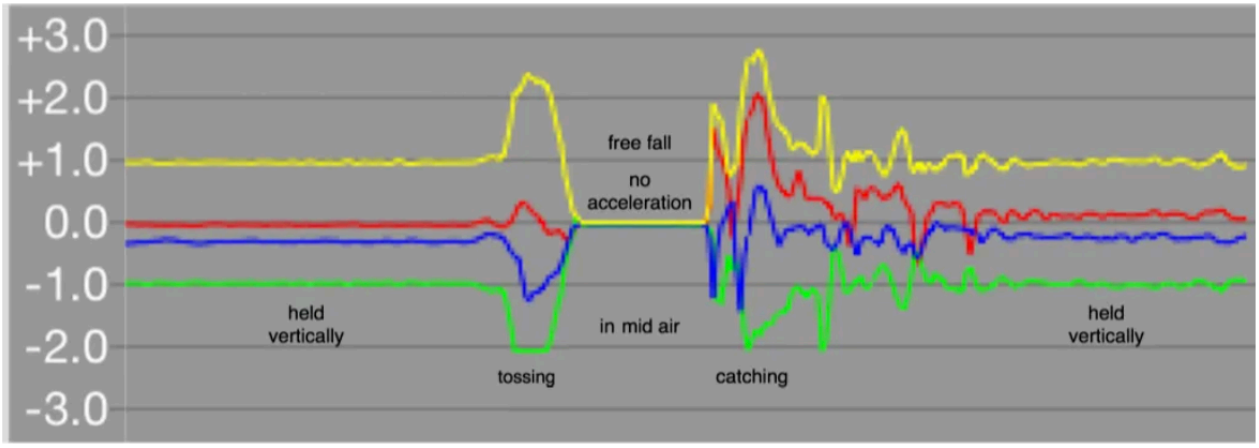
This article celebrates a little known fact: recent technology in our own pockets now offers clear and startling proof of Einstein's theory of gravity. The truth may surprise you — since today, it's *not* what most relativity students learn. It's time for a bold new approach to teaching Einstein's gravity.

Einstein's general relativity theory considers the apparent downward pull of gravity a *fictitious force* — the term physicists use for a mysterious force seen by observers who **don't realize *they're* accelerating**. In the case of gravity, this means an apple in free fall does *not* accelerate downward toward the earth — the surface of the massive earth accelerates outward and upward toward the apple! Albert Einstein famously realized this while considering his weight change, and related thought experiments, on elevator rides in 1907. He realized, *that's* why objects in free fall near earth's surface all *appear* to accelerate downward at the same rate.

Of course, it seems absurd and impossible that we on earth's surface are accelerating upward. The *non-Euclidean geometry* behind it is far from obvious. So most people can't quite accept it — and physicists aren't immune. They naturally, unconsciously continue to believe and promote Newton's useful theory, confusing students, themselves and one another.

Every experiment proves that Newton's obvious, highly intuitive theory is wrong and Einstein's utterly implausible theory is correct.



3D accelerometer display app: Horizontal axis is time; vertical axis is acceleration in g's. Red, Green and Blue represent represent acceleration along X, Y and Z axes respectively. Green is the vertical acceleration, with positive Y going *down* the screen like text — so the value of -1.0 is upward, *away* from earth's center. Yellow is the acceleration magnitude — which is 0.0 when the device is falling, NOT 1 g as Newton's theory predicted.

This short article lets readers easily understand Einstein's stunning gravity theory, and even prove it — using their smart phones and the *accelerometers* inside them. Once we take those surprising measurements seriously, and focus on how in Einstein's *spacetime curvature*, matter dynamically stretches *space* — we can both understand the geometry with very little math, *and* see why it's been hard to present before.

While the ideas remain mind boggling, here they're no longer hidden under reams of symbolic math. We'll see how Newton's gravitational constant G helps us describe *volume acceleration in proportion to mass*, the key driver of gravity in Einstein's field equation. And we'll see how the core math of Einstein's gravity is so strikingly simple, we can derive Newton's or Gauss's classical formulas for gravity from Einstein's in one short paragraph.

Rethinking Relativity Curricula

An awkward reality is exposed here: many relativity students and professors fail to correctly predict the simplest modern accelerometer experiments for gravity, don't intuitively grasp the theory, and some can not be persuaded by experimental results. Their complex physics curricula are misleading and failing them. Even Einstein felt standard relativity curricula were misleading us all. He fumed, "Since the mathematicians have invaded the theory of relativity, I do not understand it myself anymore."

This article outlines an easier approach to thinking clearly about the illusion and the reality of gravity. It lets us simply, intuitively and geometrically see how space is dynamically stretched by matter, and finally understand the *real* forces and accelerations behind gravity — enabling new curricula that can free us from a century of confusion.

References

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