# A down-to-Earth approach to understanding gravity

February 1 2017, by David Bradley

What more is there to say about gravity? Extensive astronomical observations by Galileo and Tycho Brahe laid the foundations for Kepler to formulate his laws of planetary motion and then for Newton to come up with his theory of gravity. In the twentieth century Einstein recognised that the universe is not a clockwork machine and that it has no fixed frame of reference, everything is relative. Then we had black holes, planetary precession, gravitational waves and the enigma that is sub-atomic quantum theory that we cannot yet square with the cosmic scale.

Now, H. Ron Harrison of the Department of Mechanical Engineering and Aeronautics, at City University, London, hopes to simplify our understanding of gravity by going back to Newtonian theory extending it and embedding an understanding of Einstein's special theory of relativity that takes relative velocity based on the form of the measured data into account. In this new simpler theory of gravity, which Harrison describes in the *International Journal of Space Science and Engineering*, he derives a single explanatory equation. "This equation expresses relative acceleration between two masses as a function of their masses, separation and, now, relative velocity," Harrison explains.

This formula accounts for many of the gravitational phenomena we have observed through many decades if not centuries and offers a simpler explanation for the likes of the precession of the perihelion of Mercury, the gravitational deflection of light, the Shapiro time delay (an effect that retards the transmission of a signal passing close to a strong

gravitational field), the Schwarzschild radius which accounts for escape velocity and why you cannot escape a black hole, and even gravitational waves.

Harrison suggests that his formula is less open to misinterpretation than those of Einstein. Moreover, he considers "force" to be a secondary property as was suggested by Hertz at the end of the nineteenth century. Force is the sleeping partner of gravitational formulae; it is to dynamics what money is to commerce. Tests on real observations corroborate this demotion of force and the replacement of Einsteinian complexity with a simpler set of equations. So, the Principle of Equivalence does not arise," adds Harrison.

This new interpretation which does not undermine relativity even points to the possibility of the existence of a repulsive phenomenon one might refer to as anti-gravity. At a more immediately practical level, however, it should be possible to calculate non-Newtonian variations in the trajectories of satellites, for instance, using Harrison's equations.

**More information:** H. Ron Harrison. Post Newtonian gravity, a new simpler approach, *International Journal of Space Science and Engineering* (2016). DOI: 10.1504/IJSPACESE.2016.081569

Provided by Inderscience Publishers