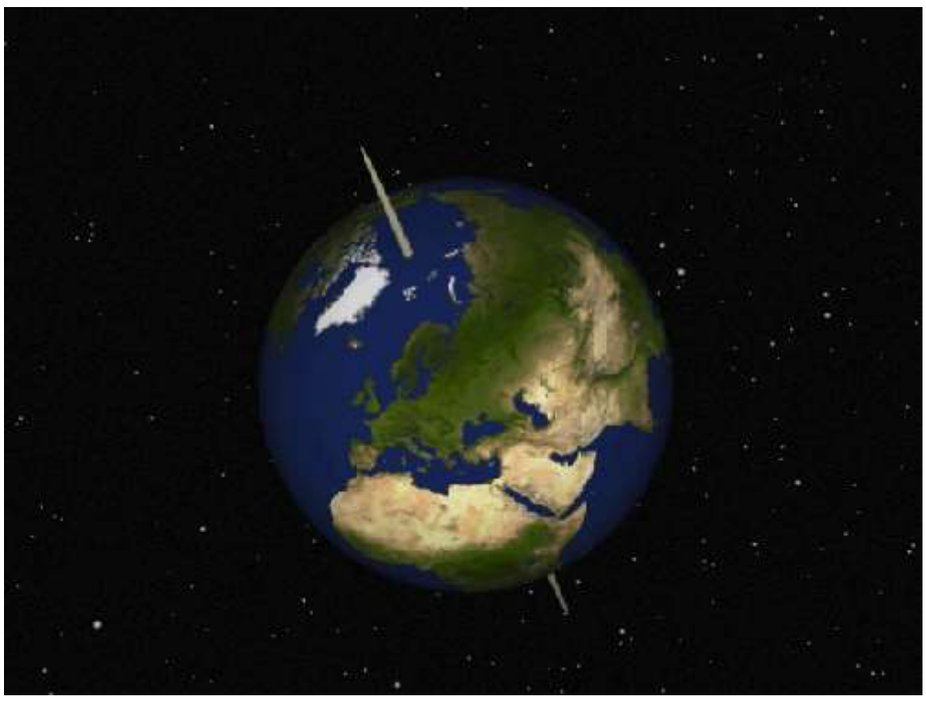
The Eötvös effect

7h ago Physics, Teaching, Science, Education, Forces

The Eötvös effect is the change in perceived gravitational force caused by the change in centrifugal acceleration resulting from eastbound or westbound velocity.

The measured effect is caused by the motion of the object traveling with, or against, the rotation of the Earth.



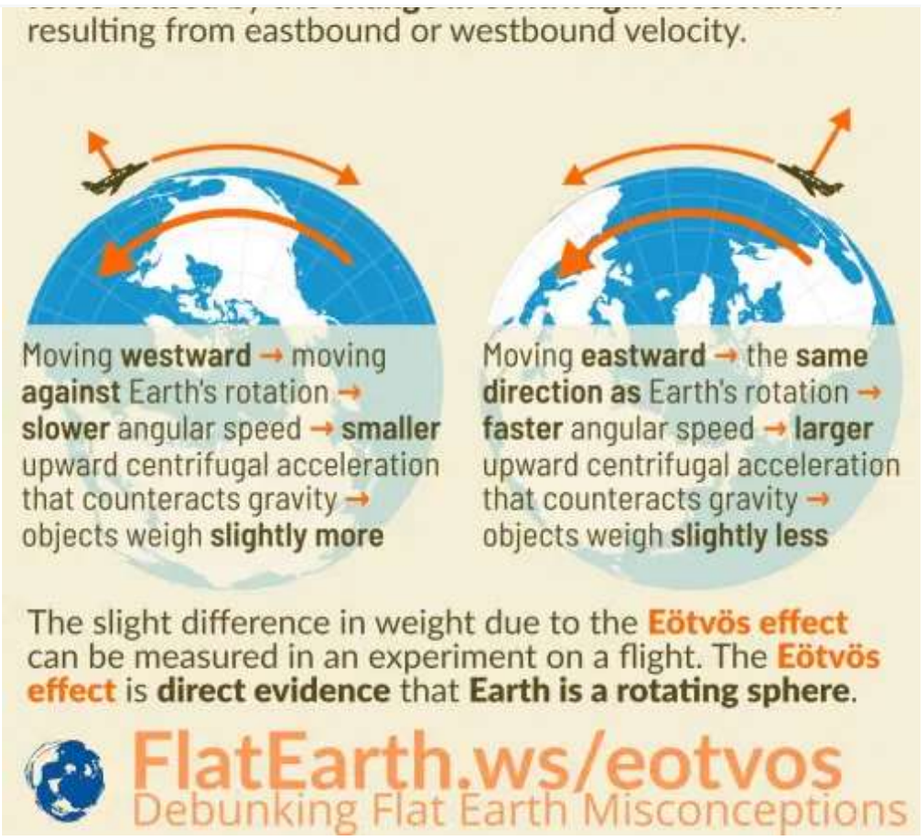
http://commons.wikimedia.org/wiki/File:Earth's_Axis.gif

When moving eastbound, the object's angular velocity is increased (in addition to Earth's rotation)

thus the centrifugal force also increases, causing a perceived reduction in gravitational force.

When moving westbound, the object's angular velocity is decreased,

thus the centrifugal force decreases, causing a perceived increase in gravitational force.



From flatearth.ws, debunking flat earth misconceptions

In the early 1900s (decade), a German team from the Institute of Geodesy in Potsdam carried out gravity measurements on moving ships in the Atlantic, Indian, and Pacific oceans.

While studying their results, the Hungarian nobleman and physicist Baron Roland von Eötvös (Loránd Eötvös) noticed that the readings were lower when the boat moved eastwards, higher when it moved westward. He identified this as primarily a consequence of Earth's rotation.

In 1908, new measurements were made in the Black Sea on two ships, one moving eastward and one westward. The results substantiated Eötvös' understanding.

Relationship between eötvös effect and Coriolis effect

Some people say that the Eötvös effect is the vertical component of the Coriolis effect. Max on Physics StackExchange explains to us

In many science disciplines, casual versus formal usages become intermixed, and this is certainly one area.

Eötvös is not the vertical component of Coriolis.

The earth is both (a) spherical and (b) spinning. This produces a number of phenomena that affect bodies in motion on or near the surface of the Earth.

properties that are not related, except for the fact that they are artifacts of (a), (b), or both.

Coriolis is a conservation of angular momentum consideration when objects move north/south across a spinning sphere.

As you move away from the equator latitudinally, the same angular rate of rotation around the Earth's C/G results in a different velocity in the east/west component, and the effects of this difference is the Coriolis Effect.

Were the Earth a cylinder instead of a sphere, there'd be no Coriolis Force. (*)

Eötvös on the other hand is a centrifugal force/orbital mechanics problem. Eötvös would still occur on a cylinder, where Coriolis would not.

There *is* an angular momentum force that acts east/west based on the height of an object's trajectory or orbit, and thus would affect the vertical component of a projectile's trajectory at long distances involving high trajectories.

But this isn't Eötvös at all. If I shoot a projectile perfectly vertically a few miles into the air, conservation of angular momentum dictates the projectile will not land back on me, it will land several feet west of me, opposite the direction of the Earth's spin. It may be more correct to think of *this* motion as the vertical component of Coriolis.

(*) This gets addressed later on this page. There would be some force, but it would different from what we see on a spherical Earth.

One in All: Double Branes with Radion Field Can Solve all Cosmological

Sumanta and Soumitra using a two brane setup have shown that, along with gauge

AP Angular Momentum!!

Angular momentum and its conservation provide the additional information we need to predict the motion of objects in space.