Large Hadron Collider could test hyperdrive propulsion

October 9 2009, by Lin Edwards

(PhysOrg.com) -- The world's most powerful particle accelerator, the Large Hadron Collider (LHC), could be used to test the principles behind hyperdrive, a possible future form of spacecraft propulsion that could drive spacecraft at a good fraction of the speed of light.

The idea of a hyperdrive propulsion system arises from the work of an influential German mathematician, David Hilbert, in the 1920s. Hilbert studied the interactions between a stationary mass and a relativistic particle moving away from it. He calculated that if the particle was moving faster than around half the speed of lightm an inertial, distant observer would see the particle as being repelled by the mass.

Now a physicist in the U.S., Franklin Felber, has taken Hilbert's almost forgotten proposal and reversed it, calculating the repulsion should be mutual, with relativistic particles also repelling the stationary mass. Felber suggests this hypervelocity propulsion could be used to propel a stationary mass to a sizeable proportion of the speed of light.

Felber likens the idea to an elastic collision between two objects of very different mass. If a heavy mass collides with a light stationary mass, the lighter mass rebounds at around twice the speed of the larger mass. In the hypervelocity propulsion drive a relativistic particle would repel a stationary mass at a speed greater than its own.

Felber has also suggested his theory could be tested in the LHC, since it will be able to accelerate particles sufficiently to generate the repulsive

force. Felber wants to install a resonant test mass beside the particle beam line inside the LHC and measure the tiny forces produced in it by the accelerated particles passing by. The mass would not interfere with the beam, and hence would not disrupt the LHC's normal operations.

The LHC, near Geneva in Switzerland, is the largest and highest energy particle accelerator in the world. It is built in a three-meter-wide circular tunnel 50-175 meters underground and 27 kilometers in diameter. It is designed to accelerate particles and smash them together to help scientists test the predictions of particle physics. It can send a particle through the 27 km ring at 99.99% of the speed of light.

If the LHC cannot be used, Felber suggests the idea could be tested at the Tevatron particle accelerator at the Fermi National Accelerator Laboratory in Batavia, Illinois. Until the LHC resumes operation, this is still the highest energy particle accelerator in operation, but since the energy is smaller than at LHC, the forces produced would also be smaller.

More information: Test of relativistic gravity for propulsion at the Large Hadron Collider, Franklin Felber, arXiv:0910.1084v1 [physics.gen-ph]

via TechnologyReview