Could self-moving objects explain away 'dark matter'?

by Bend_Weekly_News_Sources

A physÂ-iÂ-cist has calÂ-cuÂ-latÂ-ed that in four speÂ-cial places on Earth each year, for a thouÂ-sandth of a secÂ-ond, obÂ-jects might be able to move slightÂ-ly with no push of any sort.The propÂ-oÂ-siÂ-tion stems from an unÂ-uÂ-suÂ-al theÂ-oÂ-ry of moÂ-tion that some reÂ-searchÂ-ers have deÂ-vised to exÂ-plain moveÂ-ments of stars and galaxÂ-ies which, othÂ-erÂ-wise, seem to viÂ-oÂ-late the laws of gravÂ-iÂ-ty. For inÂ-stance, stars apÂ-pear to orÂ-bit the cenÂ-ters of galaxÂ-ies faster than they should.

The preÂ-vailÂ-ing exÂ-plaÂ-naÂ-tion for this is â€œdark matÂ-terâ€•: the idea that unÂ-seen blobs of an unÂ-iÂ-denÂ-tiÂ-fied subÂ-sÂ-tance perÂ-vade the uniÂ-verse. This would proÂ-vide sources of gravÂ-iÂ-taÂ-tionÂ-al pull which, added to the visÂ-iÂ-ble sources, acÂ-count for the oddÂ-iÂ-ties.

The red square marks a spot in GreenÂ-land at 79Â°50' North latÂ-iÂ-tude, 56Â° West lonÂ-giÂ-tude, where strange laws of moÂ-tion could take hold next year, acÂ-cordÂ-ing to a stuÂ-dy.

Some physÂ-iÂ-cists conÂ-sidÂ-er dark matÂ-ter a provÂ-en fact. But a miÂ-norÂ-iÂ-ty disÂ-aÂ-gÂ-ree, unÂ-setÂ-tled by the fact that dark matÂ-ter has nevÂ-er been found, even though it would have to outÂ-weigh regÂ-uÂ-lar matÂ-ter by fiveÂ-fold.

A numÂ-ber of these skepÂ-tics have deÂ-velÂ-oped alÂ-terÂ-naÂ-tive theÂ-oÂ-ries that acÂ-count for the mysÂ-teÂ-riÂ-ous moÂ-tions through slight changÂ-es to the traÂ-diÂ-tionÂ-al laws of graÂ-vÂ-iÂ-ty and moÂ-tionâ€”prinÂ-ciÂ-ples deÂ-velÂ-oped by Isaac NewÂ-ton in the 1600s and elabÂ-oÂ-ratÂ-ed by AlÂ-bert EinÂ-stein in the last cenÂ-tuÂ-ry.The reÂ-vised theÂ-oÂ-ries are known as modÂ-iÂ-fied NewÂ-tonÂ-ian dyÂ-namÂ-ics, or MOND.A comÂ-mon verÂ-sion of MOND holds that one of the most veneraÂ-ble laws of moÂ-tion, called NewÂ-tonâ€™s SecÂ-ond Law, must be reÂ-vised to give difÂ-ferÂ-ent reÂ-sults at exÂ-tremeÂ-ly low acÂ-celÂ-erÂ-aÂ-tions. TraÂ-diÂ-tionÂ-ally, the law states simpÂ-ly that an obÂ-jecÂ-tâ€™s acÂ-celÂ-erÂ-aÂ-tion is proÂ-porÂ-tionÂ-al to the force on it; in eveÂ-ryÂ-day lanÂ-guage, the harder you push it, the faster it will move. But in the reÂ-vised reÂ-gime, at near-zero acÂ-celÂ-erÂ-aÂ-tion, obÂ-jects would move acÂ-cordÂ-ing to a difÂ-ferÂ-ent law.The trick is how to deÂ-fine near-zero acÂ-celÂ-erÂ-aÂ-tion. ZeÂ-ro with reÂ-spect to what? EveÂ-ryÂ-thing moves with reÂ-spect to someÂ-thing else. In a new paÂ-per, AlÂ-ex IgÂ-natiev of the TheÂ-oÂ-retÂ-iÂ-cal PhysÂ-ics ReÂ-search InÂ-stiÂ-tute in MelÂ-bourne, AusÂ-tralÂ-ia, proÂ-poses that in our neighÂ-borÂ-hood of the uniÂ-verse, the efÂ-fects of the reÂ-vised law would beÂ-come noticeaÂ-ble in places that are at near-zero acÂ-celÂ-erÂ-aÂ-tion with reÂ-spect to the cenÂ-ter of our galÂ-axy.BeÂ-cause Earth spins, rotates and orÂ-bits in varÂ-iÂ-ous ways, its moÂ-tion overÂ-all would preÂ-clude tests of the idea. But IgÂ-natiev calÂ-cuÂ-latÂ-ed that twice yearÂ-ly, there are two points on the surÂ-face where all such moÂ-tions canÂ-cel out, putÂ-ting these spots moÂ-menÂ-tarÂ-iÂ-ly at near-zero acÂ-celÂ-erÂ-aÂ-tion with reÂ-spect to the galÂ-axy cenÂ-ter.The events would take place near the equiÂ-nox dates, two days in the fall and spring when the day is the same length as the night. The loÂ-caÂ-tions would difÂ-fer year by year. On Sept. 22 of next year, they would lie in northÂ-ern GreenÂ-land and across the globe in AntÂ-arcÂ-tiÂ-ca.AcÂ-cordÂ-ing to IgÂ-natievâ€™s calÂ-cuÂ-laÂ-tions, if this verÂ-sion of MOND is corÂ-rect, an obÂ-ject at that loÂ-caÂ-tion might briefÂ-ly shift loÂ-caÂ-tions by one fifth of a trilÂ-lionth of a milÂ-liÂ-meÂ-ter, beÂ-fore reÂ-turnÂ-ing to its origÂ-iÂ-nal place a fracÂ-tion of a secÂ-ond latÂ-er. The event would be measuraÂ-ble by inÂ-struÂ-ments known as gravÂ-iÂ-taÂ-tionÂ-al wave deÂ-tecÂ-tors, he arÂ-gued, which are built to

measÂ-ure an exÂ-otÂ-ic pheÂ-noÂ-meÂ-non inÂ-volvÂ-ing ripÂ-ples in gravÂ-iÂ-ty.The exÂ-perÂ-iÂ-ment could be a â€œmaÂ-jor stepâ€• in reÂ-solvÂ-ing the â€œthe â€˜MOND verÂ-sus dark matÂ-terâ€™ dilemÂ-ma,â€• IgÂ-naÂ-tiev wrote.OthÂ-er exÂ-perÂ-iÂ-ments that could reÂ-solve this are posÂ-siÂ-ble in prinÂ-ciÂ-ple, he notÂ-ed, but most of these inÂ-volve obÂ-serÂ-vaÂ-tions of places in space where the near-zero acÂ-celÂ-erÂ-aÂ-tion would be unÂ-meaÂ-surÂ-aÂ-ble in pracÂ-tice. The new proÂ-posÂ-al deÂ-scribes for the first time a test that could take place on Earth, makÂ-ing it doaÂ-ble, he added. The study apÂ-pears in the March 9 isÂ-sue of the reÂ-search jourÂ-nal PhysÂ-iÂ-cal ReÂ-view LetÂ-ters. A copy is also posted online here.

Courtesy World Science

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