December 24, 2008

The Editor, Sky and Telescope
90 Sherman Street
Cambridge, Massachusetts 021140-3264

Dear Sir:

"Going Over the Dark Side" in the February issue of Sky and Telescope was most interesting, both for what it said and what it did not say. For example, it says that the expansion of the universe is found to be speeding up. Why? Because the most distant type Ia supernovae are fainter than expected, therefore farther than expected. What it did not say is that there could be a different explanation, namely ***attenuation***. Was attenuation discounted for some reason? If so, why? Was attenuation allowed for but found insufficient? The article did not say. If it was not allowed for, the conclusion is unfounded.

The article implied that the expansion is accelerated now. Yet the "evidence" is provided by those parts of the universe which we see as they were billions of years ago. Do observations of nearer parts of the universe, observations of the more recent behavior of the universe, support accelerated expansion? They do not.

Given accelerated expansion, the search is on for the agency of repulsion. Electrons repel electrons, protons repel protons, etc., but these repulsions diminish as the inverse square of the separation of the charges, whereas cosmic repulsion, achieved by introducing the cosmological constant, must increase with the separation of the mass elements! Could anything be more counterintuitive? Einstein may have been right. In his own words, his introduction of the cosmological constant could have been the greatest blunder of his life.

Somehow all this is related in a rather vague way to "dark matter" and "dark energy". Their common denominator is that neither of these terms is understood. As the article states, they are "placeholders – labels that scientists have adopted in lieu of understanding the nature of the phenomenon." But they have been under our noses ever since the relativistic advance of the perihelion of Mercury was accounted for by general relativity nearly a century ago. Nothing fancier than freshman algebra will show that Mercury's once unaccounted-for perihelion advance is proportional to the average of the gravitational potential energies at perihelion and aphelion divided by c^2. (See "The Mystery of Xi Persei"). By the mass-energy relation $E = mc^2$, this is the average increase of the mass of Mercury at those two points in its orbit. That is, the mass of Mercury is shown to increase as the sun's gravitational attraction adds gravitational energy to the planet by pulling it from aphelion to perihelion and to decrease it on Mercury's return to aphelion. The increase is "dark matter" and it accounts for "dark energy".

The sun's effect on Mercury is extremely small, but would be about 9.3 million times greater if Mercury were replaced by a star like the sun. On two such stars (and the sun) , it would be twice that amount (still very small), on a million stars, a million times that amount, etc. Even if the stars were spread out much farther from the sun than Mercury, it could be a very substantial amount – increasing the "gravitational mass" of the sun sixfold. This invisible additional mass is "dark matter". The pull of this gravitational matter imparts the inexplicable "dark energy".

"The expansion should be slowing down", the article says. This may perhaps be true, but only if the universe contains a finite amount of matter. Is the actual universe trying to disabuse us of a misconception? Is there compelling evidence that the universe is of finite mass? True, we see only a finite portion of it, but what do we know of that part of it we do not see because we cannot? Nothing. Let us not allow our preconceptions to cripple our limited understanding of creation.

Sincerely,

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