Physics > General Physics

Negative Cosmological Energy Indicated by Supernova Redshift-Luminosity Correlation

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Milne's classical homogeneous-universe cosmology predicts a product of Hubble constant with luminosity distance that equals z + z2/2, where z is redshift. Supernova-data's support of this unambiguous relation implies, throughout the universe, homogeneous negative-energy 'nonmatter' that joins positive-energy 'material clumps' to yield zero mean-energy density. (Matter-clump scales are small compared to that of Hubble; 'nonobjective' negative energy is unclumped.) Although negative energy balances positive matter (particle) energy to yield vanishing mean (Hubble-scale) total-energy density, the Milne universe is not 'empty'. Milne's age-arrow, in conjunction with matter's defining characteristic of temporal-structural stability, dictates matter-energy positivity.

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