

A NEW COSMOLOGICAL MODEL: RED-SHIFT AND SCALE FACTORS

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ABSTRACT

A new cosmological model is considered which doesn't require dark energy. The expansion of the universe is reinterpreted as a 'rescaling' whereby the whole universe can change scale, yet appear static. Rescaling is a symmetry whereby there is a simultaneous change of every length in the universe and all physical constants which contain length dimensions.

It is shown that this interpretation of expansion of the universe, can lead to a Hubble law, due to changing of Hubble constant with time. Also an interpretation of expansion of the universe by red-shift of light, due to a changing of Plancks constant with time. This results in a new relationship between scale factor of the universe and red-shift. The misunderstanding of the true relationship is the cause of the apparent dark energy phenomenon.

In this paper we have discussed about the angular size of the distance that subtend at our location. Also we have discussed about the apparent brightness is related to the luminosity of the galaxy and its distance from us in the expanding universe described by the Robertson-Walker space-time and A related result is the variation of apparent surface brightness with red-shift. Finally it includes the predictions for the magnitudes of supernovae against red-shift are made and found to be in good agreement with supernovae data, without dark energy.

KEYWORDS: Cosmology, Hubble Law, Red-Shift, Distance Scale, Luminosity Distance, Dark Energy