Hans Joerg Fahr et al., J Astrophys Aerospace Technol 2017, 5:3 (Suppl)
DOI: 10.4172/2329-6542-C1-011

The fate and role of freely propagating cosmic photons in expanding universes

Hans Joerg Fahr and **Michael Heyl**
University of Bonn, Germany

According to present cosmological views the energy density of CMB (Cosmic Microwave Background) photons , freely propagating through the expanding universe, varies inversely proportional to the fourth power of the cosmic scale S . This is expected because GRT in application to FLRW (Friedman-Lemaitre-Robertson-Walker)- universes seems to be able to show that photons undergo a cosmological redshift which together with the decrease of photon densities leads to the expected S^(-4) behavior. This conclusion appears to reasonably well explain the presently observed Planckian CMB spectrum with its actual temperature of T(CMB)=2.7 K , while at the time of the CMB origin, when cosmic matter recombined, its temperature would have been about 3000 K when the scale of the universe was smaller by a factor of (1/1100). In this talk we shall question whether the scale-dependence of the CMB energy density entering the energy-momentum tensor falls off like S^(-4). For that purpoe we investigate on a new physical basis whether the wavelengths of freely propagating cosmic photons during their travels up to the present day have permanently been redshifted or their redshift only becomes apparent when CMB photons are registered by spectrometers (clocks) at these present days. We do show that photons in its own reference system cannot change their proper state, but keep their proper energy while freely propagating. This implies that the photon energy density only decreases as S^(-3) , as does the baryonic matter density. This, however, then means that both baryon and photon energy densities, entering the energy momentum tensor, do behave absolutely alike what concerns their dependence on S and hence in solutions for the cosmic expansion dynamics ,even at present days, CMB photons cannot be neglected. We nevertheless also show that such cosmic photons when registered at these days are judged as redshifted photons explaining why the presentday CMB is a Planckian radiation with the temperature of only 2.7 K.

Biography

Hans Joerg Fahr is Full Professor for Astrophysics at the University of Bonn in Germany, was President of Comm.21 of the IAU and received the National First Class award of Germany in 2003. At present he is Co-I of the NASA Satellites TWINS and IBEX.

hfahr@astro.uni-bonn.de

Notes: