The big bluff: Or is the "big bang cosmology" going to collapse ?

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Introduction to the cosmic crisis

Edwin Hubble, seduced by the voices of his contemporary astronomical colleagues, in 1929 published his data on redshifts of nearby galaxies in a highly suggestive form, namely as saying the world would explode in a homologous manner yielding in all directions higher object escape velocities with larger distances. Though the huge mass of cosmology-relevant data collected in the times after Hubble's important message from 1929 in the majority of cases, honestly said, did not satisfactorily support his early prediction, astronomers already had started to faithfully live with his "celestial message" as with the holy mystery of our universe.

This produced the era of the "big bang cosmology" lasting since then up to the present. All observational facts in astronomy since that time were turned such that they fitted into this cosmic ideology. Thus Alexandre Friedman different from Albert Einstein who first was proud to describe a static universe with his general field equations, tried to modify these equations untill they finally could describe an expanding universe. Then the cosmic background radiation at microwaves was detected and , inspired by the threatening views of atomic bomb explosions, was immediately celebrated as an echoe of the early hot phases of the exploding universe: Everything in astronomy thereafter appeared to be settled, solidified like the interior structure of a concrete building, comparable to times in physics before Max Planck detected that nature was discontinuous.

For Max Planck it was the exploration of the natural quantum jumps which forced the era of classical physics applied to a nature with continuous action flows to make a break-down. For astronomy only very few people start recognizing now that the facts to bring the "big bang ideology" to a collapse are coming up already since the last decade:
The cosmic background radiation should be isotropic with appreciable temperature fluctuations associated with nowadays cosmic structures, but in fact it has a dipolar character with nonidentifyable fluctuations. To make the dipolar character understandable requires a motion of our reference point in the universe with a velocity of 550 km/s relative to the standard of rest of this radiation, the expected reference of the Hubble flow. This indicates that neither the earth nor the centers of larger and larger hierarchical systems in the universe do care for the Hubble flow. In contrast to concepts of the conventional cosmology envisioning a homologous expansion of the joint cosmic substrate, normal radiating matter in space seems to do something very different from cosmic radiation.

The real, luminous material in the universe astonioshing to explosion cosmologists does something completely different from what our present theories describe. Galaxies are not the slaves of the universal Hubble flow - and thus are not coming from a big-bang if traced back in time. Their redshifts are of a typological rather than of a cosmological nature and they are grouped in structural hierarchies, far from being homogeneously distributed in space as theorists up to now have taken for granted, when developing their cosmological models of the univers. If all of this is honestly taken into account, it must be clear that we cannot continue with an anachronistic ideologistic tradition in cosmology. A new cosmology has to be created by independent thinkers and researchers! There are now books available which do first steps towards the "new age cosmology" (E.Lerner, 1992, Arp et al., 1990, Breuer, 1993, Hoyle et al., 1993, Fahr, 1996)

The ageless Universe: Galaxies at and before the Big-bang!

For those believing in a Big-bang universe it is evident that cosmic objects belonging to this universe cannot be older than the Big-bang itself. However, there are objects in this universe which are puzzlingly old. The question of how far back in the past the Big-bang took place should be answered by the famous Hubble constant H which by its reciproke (1/H) roughly determines the age of the universe.

Unfortunately this constant does not have a fixed value by itself, but needs to be derived from observations. But there is a controversy with this constant: Looking into different directions, and deriving object distances by different methods, one will be led to rather different values for H of between 40 to 100 [km/s/Mpc]. For a value of $H = 100$ the associated age of the universe should be smaller than 10 Billions of years. In such a world the known globular star clusters in our and other galaxies with ages of 15 to 18 Billion years appear as extra- universe objects.

Discrepancies of even higher challenges to Big-bang cosmologists are connected with cosmic objects seen at very high spectral redshifts $z = Dl/l$ indicative for very large distances, or correspondingly very early times at which they are seen by us, so to speek - times when the Big-bang itself just may have happened. Quasars for instance, distant radiation monsters in space, are known to have especially high redshifts. The one with maximum redshift at present has a redshift of $z = 4.9$. In the Hubble world objects with such high redshifts do show us this world's objects at a very early state of the cosmic evolution when the universe should only have occupied less than one hundredth of its present volume. At such a dimension the universe can only have had an age of 1.5 Billion years. Thus high-redshift quasars must be seen by us very close to the Big-bang event. The question at all is whether the hot and dense universe can produce them within such a limited period of time left since the bang happened, especially in view of the fact that material contraction to objects can only start after cooling of cosmic matter down to below 5000 Kelvin, occuring at about a Million years after the Big-bang.

The Princeton astronomer E.L.Turner has calculated that a quasar with its standard energy emission of 10 erg/s must have accumulated a central black hole with a mass of at least 100 Million solar masses surrounded by an accretion disk of about an equal mass and by extended halo matter of hundred times as much mass. Given the most rapid gravitational fragmentation rate for a condensation from the cosmic background material and a very fast star building process Turner estimates that the evolution of the supermassive black hole in the center of such an object takes at least 2 Billions of years. This more or less clearly means that the beginning of the quasar production must already have started before the Big-bang occured, unless present astronomical theories of quasar origins are by far wrong.

Perhaps there may exist some doubts whether quasars are well enough understood as to draw so far reaching conclusions: maybe their redshifts are of an exotic, noncosmological, rather than but of a Hubble-like nature! This is in fact nowadays seriously suspected by many serious astrophysicists (see e.g. Arp,1987, Narlikar, 1989); then their distances may be highly overestimated and their energy outputs may thus be classified as fairly normal or at least not abnormal. Thus there would be no need to date the birth of these monsters back into the times before the Big-bang. The problem, however, of cosmic objects not respecting the age of the Big-bang universe is not removed this way. Just recently new observations have become known showing that very normal looking galaxies of completely conservative morphologies appear at extremely high redshifts of the order of $5.0 < z < 7.0$ and thus reveal very puzzling birth dates. According to first interpretations they are seen much too close to the expected Big-bang event. J.Dunlop et al. (1997) report in NATURE on a 3.5 Billion year old, normal, extremly red radiogalaxy with identification number 53W091 which is seen at an abnormously large redshift of $z = 1.5$. The excessive emission in the red part of the spectrum of this galaxy allows the authors to draw the the firm conclusion that this galaxy already has produced a large fraction of old stars with their well known colour excesses at the red part of the spectrum. Due to this finding the authors can safely derive an evolutionary age of this galaxy of at least 3.5 to 4.5 Billions of years.

This again brings up a massive age-problem! How can objects which we see at a very early state of the cosmic evolution already have an age of more than 3.5 Billion years? At the time when this galaxy emitted its light which we receive today the universe can only have had a radius of one third of its present value and the cosmic background radiation still was hotter by a factor 3 than today, i.e. about 10 Kelvin. Under these hot background conditions no gravitational fragmentation to stars in primordial galactic clouds may be possible at all in addition to the fact that the Big-bang is still much to close to allow for billion-year old stellar objects.

In an even more recent publication in NATURE the international astronomer team Lanzetta, Yahil and Fernandez-Soto reported that under the great number of galaxies they have investigated using a four-colour photometry with the HUBBLE space Telescope there were four with outstanding redshifts of more than z = 6. Such values of object redshifts were never seen before by other astronomers. The fact that these highest redshift objects are in fact galaxies could be confirmed by the optical images which in addition were made of the same objects by the HUBBLE space telescope. By application of four appropriate colour filters with well determined wavelength bandpaths the authors could carry out a fast and sensitive spectral analysis yielding the effective redshift of these objects. Hereby they made use of the fact that wavelengths shorter than the hydrogen ionisation wavelength (H-Lyman-edge: 912 Angstr"m at laboratory conditions) are strongly absorbed by objects surrounded by hydrogen, like all galaxies and quasars. Galaxies close to us thus will not emit radiation at wavelengths shorter than 912 A. Objects with high redshifts, however, have a redshifted Lyman-edge and thus will not show any emission at wavelengths shorter than this redshifted edge. So just looking for the spectral breakdown in the object spectrum will clearly tell about the redshift of the object.

When galactic objects are seen at redshifts larger than z = 6 then it means that they must have emitted their light at a phase when the universe only had a radius of one seventh (i.e. a volume of 1/350!). According to most of the cosmological models this phase can only be less than one Billion years after the Big-bang event. Since these galactic objects for sure should have ages of more than one Billion years they thus cannot be objects of this Big-bang universe, unless present cosmologies are completely wrong. Then the idea may be suggested as a solution that possibly the universe may not have an age at all, it only runs through cycles of always repeating processes of production and destruction of objects and hierarchical cosmic structures at all scales of time and space. The universe is something like a selfsustaining system of nonlinearly interacting nonequilibrium subsystems, dissolving themselves at some places and thereby driving action flows which create identical cosmic entities at other places (see Hoyle et al., 1993, Fahr, 1996, 2002).

Cosmic Messages from the Empty Sky

Since the discovery of the cosmic background radiation by Penzias and Wilson in 1965 the astronomical world is inclined to believe in a basic cosmic fact which still waits for an adequate interpretation. It is the fact of the existence of a background radiation, no matter if of cosmic or noncosmic nature, which is perfectly isotropic and thermal. Conventional astrophysics explains this radiation as a relict phenomenon of the hot Big-bang genesis of the universe and points back to times in the early expansion phase when the material and the electromagnetic universe was dynamically strongly coupled. This joint cosmic genesis of particles and photons makes the question highly stressing why is the background radiation absolutely smooth like the surface of a perfect balloon skin, while cosmic matter appears in strongly pronounced hierarchical structures. Somehow marginally small fluctuations should at least have been present in both primordial fields of cosmic realities, i.e. particles and photons, in the very early phases of the cosmic evolution. While the initially small density fluctuations in the particle field since those early times could grow to larger and larger fluctuation amplitudes which are shown in present day matter structures, by some mysterious reasons those fluctuations in the photon field did not grow or were even evanescent.

Since October 1989 the NASA satellite COBE devotes his observations to the details of the cosmic background radiation and finally seems to have identified some first hints of intensity fluctuations in it. Over angular diameters of about 10 degrees at the sky Smoot and co-workers (Smoot et al., 1992) find fluctuations in the radiation temperature of the background by less than 3×10^{-5} K. To fully appreciate the extremely small magnitude of these fluctuations one should have in mind the fact that first the background radiation field has to be cleared from contaminating galactic foreground radiations which are superimposed and have much larger fluctuation amplitudes, before the COBE-detected residuals can eventually be found. In addition there is a dipolar temperature component hidden in the background radiation field which is considered to be due to the special relativistic Doppler tuning of the background radiation caused by the peculiar motion of the earth with respect to the cosmic radiation field. Connected with a required peculiar velocity of 500 km/s large structure temperature variations of the order of 10^{-3} can this way be reduced in the observed background intensity field, leaving then only residual fluctuations of two orders of magnitude lower values. These latter fluctuations are seen as the image of density fluctuations at the early epoch of cosmic evolution when matter and photons started to dynamically decouple from eachother.

This brings up the problem to understand how from these extremely inferior fluctuations the structures of the present cosmic matter distribution can originate. The present universe is hierarchically structured from smallest to largest lengthscales. Up to now astronomers could not see far enough into space to confirm an eventually homogeneous matter distribution, not even at the largest scales of 1000 Mpc. In fact at the largest scales one finds much more structureness as can be explained by any of the present structure formation theories, even when discussing them under the influence of exotic physical "hat-drawn rabbits" like cold dark matter and positive cosmological constants in the permitted ranges. The question thus either is whether we perhaps do not understand the nature of the cosmic background radiation, or we do not understand the process of structure formation in the universe, - or whether no Big-bang at all occured to form the inconciliant fields of cosmic matter and cosmic radiation.

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