The process which produced the dark energy

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Abstract

$E = mc^2$ is only true for particles for which $mcr < h/2\pi$. For nucleons $E_0 = m_0c^2/16$ applies. In the Big Bang when neutrons and protons formed from quark triplets, the mass energy was only one sixteenth of mc^2 and the rest was free energy, of which only about 1/e exist today due to the accomplished expansion work of the universe. Based on the knowledge of the formation process of dark energy, the mean Hubble constant can be calculated as 74.09 km/sMpc (range 52.39 km/sMpc to 90.74 km/sMpc), that implies that dark energy may be inhomogenously distributed in this universe.

Hubble constant projects in the past (1) have shown that the dark energy already existed in the very young universe. But what is dark energy and when did it form at the beginning of everything? Albert Einstein (2) already recognized that the particles have an intrinsic rest energy. $E=mc^2$, however, is only true for quarks and electrons (and neutrinos). For protons, $E_0=m_0c^2/16$ applies. For particles with $mcr < h/2\pi$ (quarks, electrons, neutrinos) the rest energy is calculated as:

$$E = mv^2 = \frac{mh^2}{4\pi^2m^2r^2} = \frac{h^2}{4\pi^2mr^2} = \frac{m^2v^2\lambda^2}{4\pi^2mr^2}; \quad rmc \leq \frac{\mathrm{h}}{2\pi} = \frac{mv\lambda}{2\pi} \rightarrow cr \leq v\lambda/2\pi;$$

$$E = \frac{m^2v^2\lambda^2}{4\pi^2mr^2} \geq mc^2 \coloneqq mc^2 \quad [1]$$

For nucleons the rest energy is:

$$E_0 = mv^2 = \frac{mh^2}{4\pi^2m^2r^2} = \frac{4\pi^2mh^2m^2c^2}{64\pi^2m^2h^2} = \frac{mc^2}{16}; \; r = \frac{4h}{2\pi mc} = 0.841 \cdot 10^{-15}m \quad [2]$$

$E=mc^2$ can only be reached if protons are placed in a magnetic field that more than quadruples the rotation velocity of the protons. From the zitterbewegung $f = 2mc^2/h$ (3) multiplied by the quantization factor v/c and 2, and divided by 16 = 4mvc/16h, one obtains exactly the proton radius 0.8412356 fm, which proves $E_0 = mc^2/16$ for protons.

When neutrons and protons formed from quark triplets in fractions of a second after the Big Bang (4), whose rest energy was only one sixteenth of mc^2 and the rest was free energy, of which only about 1/e is available today due to the universe expansion work done (4), one finds free, dark energy in a proportion of 15a/e = 68.98%, which exactly corresponds to visible matter of 31%, the rest is dark energy at approx. 69%.

Based on the knowledge of the formation process of dark energy, the Hubble constant can be calculated according to:

$$E = \frac{15\bar{a}mc^2}{16e} = \frac{1}{2}mv^2; \quad v = 1.1746\,c; \quad \bar{a} = 2 \quad range[1-3] \quad [4]$$

$$P = \frac{U}{Vt}Ad = \frac{U}{\frac{4}{3}\pi r^3 t}4\pi r^2 d = \frac{3U}{rt}vt = \frac{3Uv}{r} = \frac{UH_0}{Mpc}; \; \frac{3v}{r} = \frac{H_0}{Mpc} \quad [5]$$

$$\frac{H_0}{Mpc} = \frac{3v}{r}; \quad H_0 = 3 \cdot 1.1746\,c \cdot \frac{Mpc}{r} = 74.09\frac{km}{sMpc} \quad [6]$$

This value matches exactly with the value from the evaluation of Hubble images using the gravitational lensing method of 74.09 km/sMpc (6). A relativistic calculation is here not necessary, since the space and not the masses are accelerated by the dark energy. Since on average a=2 nucleons were formed from quark triplets (ranging between min. 1 and max. 3, depending on the plasma density), the mean a value is 2. Therefore, the energy distribution of dark energy is inhomogeneous, hence, the Hubble constant is calculated on average at 74.09 km/sMpc (range 52.39 km/sMpc to 90.74 km/sMpc). This means that all measurements that have been carried out so far (7) are within the theoretically determined range. A simplified calculation for the dark energy ($0.69mc^2$) yields the same result:

$$E = 0.69mc^2 = \frac{1}{2}mv^2; \quad v = 1.1748\,c$$

$$\frac{H_0}{Mpc} = \frac{3v}{r_u}; \quad H_0 = 3 \cdot 1.1748\,c \cdot \frac{Mpc}{r_u} = 74.1\frac{km}{sMpc} \quad [7]$$

Conclusions

$E=mc^2$ is only true for quarks, electrons and neutrinos. For nucleons $E_0 = m_0c^2/16$ was determined using the proton radius $r=4h/2\pi mc$. At the time when neutrons and protons formed from quark triplets in the Big Bang, the mass energy was only one sixteenth of mc^2

and the rest was free energy, of which only about 1/e is available today due to the universe expansion work done. Based on the knowledge of the formation process of dark energy, the mean Hubble constant can be calculated as 74.09 km/sMpc (range 52.39 km/sMpc to 90.74 km/sMpc), implying that dark energy is inhomogenously distributed in the universe.

References

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