Einstein's paper yielding his Nobel prize.

Ann. Phys. 17 (1905): 132-148; dated: 1905-03-17, received: 1905-03-18, published: 1905-06-09.

(...) ist bei Ausbreitung eines von einem Punkte ausgehenden Lichtstrahles die Energie nicht kontinuierlich auf größer und größer werdende Räume verteilt, sondern es besteht dieselbe aus einer endlichen Zahl von in Raumpunkten lokalisierten Energiequanten, welche sich bewegen, ohne sich zu teilen und nur als Ganze absorbiert und erzeugt werden können.

(...) when a light ray propagates from a point, the energy is not continuously distributed over an ever increasing volume, but it consists of a finite number of energy quanta, localised in points in space, which move without being divided and which can be absorbed or produced only as a whole.

Photons do NOT change while progressing.

Einstein: Zur Elektrodynamik bewegter Körper.

Ann. Phys. 17 (1905): 891-921; dated: 1905-06, received: 1905-06-30, published: 1905-09-26.

Dies ist das Doppelersche Prinzip für beliebige Geschwindig-

59*

912 *A. Einstein.*

keiten. Für $\varphi = 0$ nimmt die Gleichung die übersichtliche Form an:

$$\nu' = \nu \sqrt{\frac{1 - \frac{v}{V}}{1 + \frac{v}{V}}}.$$

Doppler effect.

Energy of a light complex.

914 *A. Einstein.*

welche Formel für $\varphi = 0$ in die einfachere übergeht:

$$\frac{E'}{E} = \sqrt{\frac{1 - \frac{v}{V}}{1 + \frac{v}{V}}}.$$

Es ist bemerkenswert, daß die Energie und die Frequenz eines Lichtkomplexes sich nach demselben Gesetze mit dem Bewegungszustande des Beobachters ändern.

For *observed* longitudinal time dilation, light travel time *must* be taken into account.

Presume a distant object is a coherent light source that counts its own emitted wave periods. Then it is a clock, which we read by counting the received periods. If it is moving away in the line of sight, we will obviously see it slowed down by the **Doppler factor** & **not** by the Lorentz factor.

Suppose a beam of light is redshifted hence also relativistically dimmed. Both its observed frequency and its flux are lowered by the Doppler factor.

Its original emission duration is dilated by the very same Doppler factor, so ultimately, the very same amount of energy will be received as what was emitted. Flux $\times$ duration is the same in both frames.

If light is considered a wave, this makes sense. The mean energy flux depends on the amplitude squared, which will be lowered by the Doppler factor.

If light is considered a stream of photons, it still seems to make sense if the energy flux is proportional to the photon flux (impingement frequency).

But shouldn't/doesn't each and every photon itself have a Doppler-lowered frequency ≙ energy yielding its color?

Then the no. of photons received should – in order to ultimately receive all energy – exceed the amount that was emitted.

And what if the light source is only one single atom with an excited electron that falls back to the ground state by emitting just one single photon?

The received photon must be Doppler shifted, so now definitely less energy is received than emitted. But, according to Einstein, energy quanta are immutable! Where did the difference go? Or would it just be impossible for this lonely atom to emit this photon?

Individual photons cannot redshift[1].

[1] And cosmological redshift was never deduced from ascertained truths, hence it's a figment of imagination (cf. phlogiston); its concept conflicts with Einstein's immutability of energy quanta; see http://henk-reints.nl/astro/HR-Hubble-Lemaitre-slideshow.pdf.

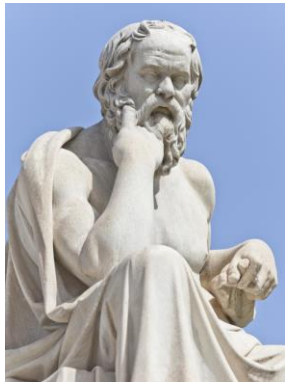
Or is (a large enough amount of) light redistributed in the new frame, adjusting both the no. of photons and their energy? The absorbed count divided by the emitted would then equal the Doppler factor. Since both must be integer, redshift would be quantised.

The light source (or its frame or what?) would on beforehand know the ultimate observer's velocity! Mathematically, each observer always drags his proper frame (which spans the entire cosmos) with him, without the *speed of light* being a limit. Does the light source somehow "feel" its velocity?

On the quantum level, only single photons exist.
Wouldn't it be *understandable* if something *incomprehensible* is going on?

Heisenberg's uncertainty principle would certainly play a role.

Mother Nature unsurprisingly surprises us once again.



I know I know nothing.

Σωκρατης

Manuel