Supernova type 1a at z=2.9 image is dramatically changed by light scattering – the third direct confirmation of tired light theory.

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Abstract.

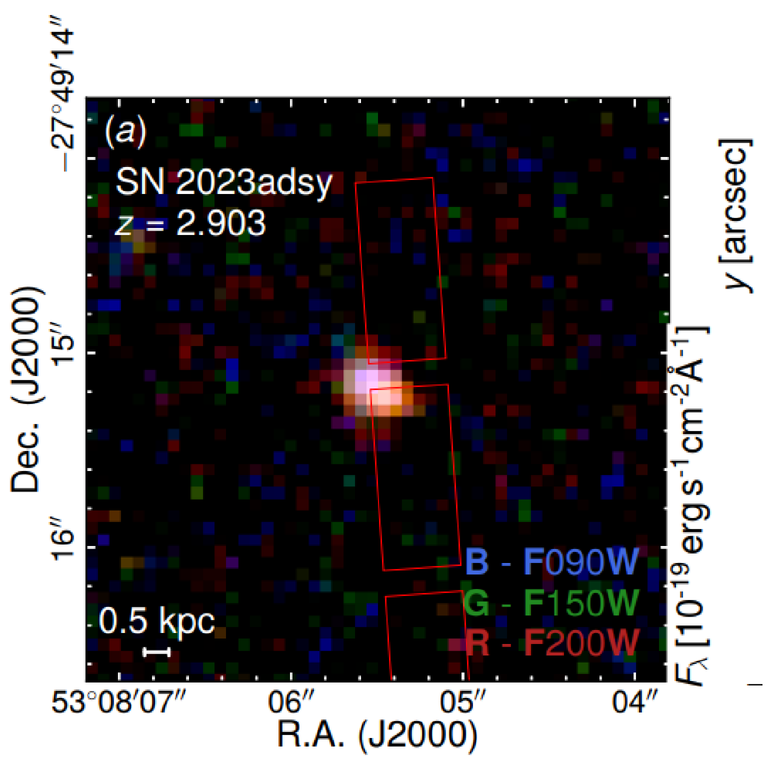
James Webb Space Telescope continues to make discoveries and some of them seemingly contradict to all known astrophysics data. For example the supernova type 1a (standard candle, well researched object) was recently recorded [1] but the overall image size of that supernova at a distance of z=2.9 corresponds to around 5000 light years at this distance and angular size is around 10 times resolution of the telescope and by far larger than any physics possibly allows. This size is a size of small galaxy and by no means may be allowed for supernova (especially standard candle, which is well researched and all sizes are predicted long ago). The only reason for such a blurred big image is the scattering of light itself – the further the object observed the larger that scattering [2] and the evaluation of the size of the image (angle of scattering) using formulas from [2] seems to confirm once more the tired light theory.

Introduction.

Tired light idea for long time was the main competitor of the Big Bang Theory and recent discoveries of the too large too big too early galaxies at z=13 created a strong interest in this concept. Tired light hypothesis was initially rejected because of two main reasons: the dispersion of the energy (exactly like Doppler effect) can not be reproduced by any known in quantum mechanics process (either no dependence on energy or energy in power 2 or energy in power 4 are possible) and the light scattering should be too strong for one-time interaction of photon which leads to z larger than tiny number like 0.001 – all images should be completely blurred. While the first problem seems no possible easy solution (new physics is necessary) the second problem may be overcame quite easily – if photons are scattered in extremely small steps (billion and trillions of them are necessary for say z=1 and higher) the scattering of light and blurring of images will be almost completely absent at small z<0.1 but eventually present at z>5-12. Time dilation is also not a problem to explain through this mechanism – some photons will wander in diffusion-like manner well away from the direct line of site but then return back, thus adding distance to the overall trip and arriving days later (see [2]). In [3] the well known phenomenon of dimming supernova type 1a (standard candles) was addressed from the point of view of light scattering and in this publication the supernova 1a direct taken image is explained from the point of view of tired light hypothesis.

Main part.

The observation of the supernova by JWST is especially important since it is the first known supernova at relatively high z=2.9. The picture below is taken from [1]



The diffraction limit of the James Webb Space Telescope may be evaluated using the famous formula: λ/D, where λ is the wavelength (1 um for the estimate) and D is the diameter of the mirror (6.5 m), so angular resolution is ~1.5*10exp(-7) rad. The visible diameter of the supernova type 1a is around 0.3 arcsecond, which would correspond to 1.45*10exp(-6) rad, that is around 10 times higher than the diffraction limit. This is way too much for the supernova at z=2.9 – by no means may be resolved at such an enormous distance. Quite the opposite – in the case of the complete absence of light scattering the further the supernova, the more it would be looking like a diffraction limited dot on the image. If James Webb Space Telescope may give some hope to resolve the closest supernovas (for z~0) at such a distance z=2.9 this is not possible. But if the tired light hypothesis is taken into the consideration and formulas from [2] are used, the situation looks different.

According to [2], change of the pulse and energy of the quantum is decreased according to the relation:

$\Delta p/p_o=\alpha*\mathrm{sqrt}(N)$ $\quad E_N/E_o=(1-\alpha)^N$

Here p_o and E_o are initial pulse and energy of the photon ($E_o=p_o*c$, c is speed of light), N is the number of scattering (and energy change at each event is directly proportional to the energy with coefficient α), Δp – is the change of pulse for one particular direction (total decrease in pulse is of course determined by the formula $(E_0-E_n)/c$ and much larger compare to Δp in one direction because the change of pulse is chaotic like diffusion) and E_N is the energy of photon after N events. It is assumed that the scattering vectors are forming sphere – this is actually a very approximate idea because of relativity obviously involved – most probably the majority of events of scattering are in the direction of the light propagation and the shape of scattering is very elongated ellipsoid. Imagine the car is driving on highway during rain – a majority of water droplets are striking the front windshield, but some droplets do strike the side windows. The same situation is here – majority of interactions are along the axis of propagation but some are inevitably lead to scattering aside. In this approximation they are equal (coefficient is 1 instead of something like 0.001 or even smaller for very elongated ellipsoid instead of sphere). This is because the introduction of the relativity into the evaluation of such complex problem like new type of light scattering is well above my experience in theoretical physics, I am only making rough analysis of the observed light scattering.

Since the pulse may be changed in any direction the first relation describes the approximate angle of the scattering. Using the famous relation between E_N/E_o and z: $E_N/E_o=1/(z+1)$ we have:

$\Delta p/p_o=\alpha*\mathrm{sqrt}(N)$; $1/(1+z)=(1-\alpha)^N$

Taking α=2*10exp(-12) from [2] for z=2.9 we have: N=0.68*10exp(12)

$\Delta p/p_o$=2*10exp(-12)*0.825*10exp(6)=1.65*10exp(-6)

This value is quite close to the measured directly angular size of the supernova of 1.45*10exp(-6) and indeed much larger than the resolution of the James Webb Space Telescope – it means that despite the supernova itself can not be resolved, the light scattering (a new property of light, very weak scattering) is visible directly and more or less coincides with the formulas described previously and obtained from the blurring of the images of the far galaxies at z=12-13. Seems that tired light hypothesis got one more direct confirmation – the light scattering is visible directly, as it should be for the case.

Conclusion.

In addition to the cases outlined in [2,3] the closer and very bright object like supernova type 1a (well investigated standard candle, all the properties are well known) offers one more confirmation for the tired light hypothesis – the scattering of light is observed directly, the observed spread is 10 times the diffraction limit of telescope and the experiment is more and more easy to interpret.

References.

1.J.D.R.Pierel at all "Discovery of An Apparent Red, High-Velocity Type Ia Supernova at z = 2.9 with JWST" // 2406.05089 (arxiv.org)

2.D.S.Tipikin "Tired light hypothesis possibly got confirmation by direct observation of light scattering." // 2311.0060v1.pdf (vixra.org)

3.D.S.Tipikin Tired Light Hypothesis Got Second Direct Confirmation from Supernova Light Curve, viXra.org e-Print archive, viXra:2405.0154

2405.0154v1.pdf (vixra.org)