Subject:
The constant $c$ in the equation
\[ E = m \cdot c^2 \]
is called the speed of light.

Deficiencies:
The Theory of Special Relativity can be derived from Newtonian mechanics by adding one new axiom: the energy mass equivalence. When doing so, it turns out that there is a universal speed limit. When momentum is supplied to a particle (or a body), it approaches this limiting velocity $c$. The smaller the rest mass of the particle, the faster the velocity converges to this speed limit. If the rest mass is zero the particle can move only with the limiting velocity. The value of this velocity can only be found experimentally.

When calling this limiting velocity “speed of light” the impression results that light plays a special role in the Theory of Relativity. It appears that all the other particles have to comply with the light. We believe that this is not a fortunate view of things, since all particles independently obey the same laws. There is nothing special about light, except that its rest mass is zero. But even in this respect it is not unique.

Origin:
Usually, when deriving the laws of Special Relativity one does not start with the energy mass equivalence, but with the observation that the velocity of light is independent of the reference frame. When doing so, the light plays from the beginning a special role.

When considering the complete theory one can note that photons are not fundamentally different from other particles. They are subject to the same laws as all the other particles. They are distinguished only by the values of those physical quantities which characterize them. As far as mechanics is concerned these quantities are the rest mass and the intrinsic angular momentum.

Another reason for the preferential treatment of the light may be that when introducing the Theory of Relativity kinematics is at the focus. Light flashes and light clocks in and at the side of running trains play an important role. In this way again the idea is conveyed that light is a special thing in relativity. This point of view can be understood when considering the situation at the beginning of the 20th century. At that time, nothing was known about gravitational waves that move with the same velocity as light. No neutrinos were known that move with almost the limiting velocity and there were no accelerators and colliders where many other particles are accelerated to the limiting velocity.

Disposal:
Say that there is a speed limit that is binding on all bodies and particles. Photons and gravitons move with exactly this velocity, as far as we know. It was believed for some time that this is also true for neutrinos.

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