The accelerated expansion of the universe can be explained by what is explained below:
The Friedman equation describes the expansion of the universe on the basis of densities. These densities can be: vacuum energy density and matter density (dark and visible matter).
Now suppose the universe began with a certain amount of vacuum energy compressed into a sphere (I will come back to that later) in a really empty space. The sphere has no rotation (that has been measured experimentally) and that makes the calculation simple using the Friedman equation.
The sphere expands radially because vacuum energy has a pressure to the outside, in contrast to matter that gives a pressure to the inside. But that matter is not yet present at the time of the big bang! The initial expansion speed of that vacuum energy sphere can be calculated and comes out at $\sqrt{3} * c$. This is therefore greater than the speed of light.
As soon as the expansion speed falls below the value of c, matter can be formed from vacuum energy anywhere in the universe at those places (sphere shells) where the expansion speed has fallen below c (initially the outer shell of the sphere, since it has the smallest expansion rate, and with the passage of time, the spherical shells from the outside to the inside. Within the vacuum energy sphere, there is always the same energy density at a particular time, but not the same expansion rate).
Initially visible matter (is heavier than dark matter because of the charge) and later dark matter (matter without charge). This process is still on going and explains the accelerated expansion that is being observed in a very simple way!
As long as only vacuum energy radially expands, the expansion speed becomes slower and slower. However, when it falls below c, matter can be formed.
The expansion speed is now even slower for 2 reasons:
1) Vacuum energy disappears and returns in the form of matter.
2) Matter brings pressure within (gravitation) .

Once enough matter has been formed to give a noticeable counterbalance to the vacuum energy expansion, one sees an additional delay of the vacuum energy expansion, viewed from the centre of the sphere! This happened about 6 billion years ago.
From this point of view, the observer on earth moves with the vacuum energy expansion and the first formation of matter then took place in the outer shell as soon as the expansion speed dropped below c. The first matter particles could then be photons. They are the matter particles that move with the speed of light.
So there is indeed a preferred direction in the universe, namely the centre of the big bang. This would then be the opposite direction of the residual speed that remains after correction of all velocities to which the earth is subject when measuring the 3K-background radiation. That speed would then be the current expansion speed of the earth compared to the centre of the big bang.
If we look at the direction of the big bang from the earth, then at a very large distance it might be possible to see empty space, depending on whether the expansion speed is still above the speed of light. Most likely this is no longer the case (the universe is too old) and, viewed from the centre of the big bang, the expansion speed is below the value of c radially everywhere and therefore matter formation takes place everywhere in the universe.
The earth is clearly not at the edge of the universe because we see matter in all directions around us.

The current view is that the space is expanding, but it is actually the vacuum energy that expands and takes up the matter formed therein. This immediately solves the problem of what's on the edge of the universe: just empty space, real vacuum!
Now for the explanation: because there is an extra delay of expansion from the centre of the sphere due to matter formation, the observer on earth (who moves with the expansion) perceives this as acceleration! After all, the observer observes the current expansion at the current time and that is therefore extra delayed, but looking back into the universe he observes an acceleration, exactly what one has now observed!
Incidentally, in this model, viewed from the earth, the observed acceleration is not the same in all directions! That only applies when viewed from the centre of the big bang and then it is a delay!

Looking at it from the centre of the sphere, this model means that the conversion of vacuum energy to matter still continues, until all vacuum energy has been converted to matter. By that time there is no longer talk of expansion but contraction. As soon as that contraction reaches the speed of light, all matter is converted into vacuum energy and a new big bang takes place.
The only question that remains is: where does all that matter / vacuum energy comes from?

Three physicists have won the 2011 Nobel Prize in physics for their proof that the universe is expanding rapidly. The physicists made this remarkable find by determining the distance of supernovas.

Saul Perlmutter of the Lawrence Berkeley National Laboratory will receive the Nobel Prize in Physics in December with his colleagues Brian Schmidt and Adam Riess . Perlmutter started his Supernova Cosmology Project in 1988 to measure the supposed delayed expansion of the universe. With a competitive project, High z Supernova Search Team, Brian Schmidt and Adam Riess were on track since 1994. The groups were involved in a race.

The idea was that due to the large amount of matter in the universe the expansion will slow down. The bewilderment was great, according to Schmidt by telephone at the presentation, when he and Riess got crazy results in the late 1990s. "Crazy to be true." Nevertheless, they could not find any errors in their observations. The weird results turned out to be correct and eventually they published the result.

The discovery that the universe is expanding rapidly confirms Einstein's idea that the universe contains a lot of energy as well as matter. That energy now ensures accelerated expansion

Light beacons

For their measurements, the physicists looked at supernovas of the type Ia in their projects. They arise when a white dwarf explodes. Some smaller stars turn into such a white dwarf at the end of life. Sometimes the gravitational field of such a white dwarf can suck in matter from a neighbouring star. If the mass of the white dwarf is 1.4 times the mass of the sun, all kinds of fusion reactions inside the star run wild. What follows is a powerful explosion, a supernova, with a specific brightness. These are a kind of beacons, where the brightness of the supernova is a measure of the distance.

Now such supernovae are very rare. In a galaxy like the Milky Way, a white dwarf explodes only once or twice a millennium. In the supernova projects, astronomers made use of modern techniques, including photosensitive chips that monitored thousands of galaxies. That way they could see a few dozen of those supernovae. They discovered that further back in time, at a distance of six billion light years, the supernovae were much weaker than expected. Apparently their distance to the earth was greater and that is proof of a faster expansion of the universe.

Physicists are usually conservative, one of the Swedish members of the Nobel Committee emphasizes at the announcement, but nevertheless the observations and conclusions of the new Nobel Prize winners were quickly accepted after their publication from 1998 onwards. Other measurements confirmed the conclusions. "This research forms a milestone in physics, and provides a new understanding of the universe."