

Dr Jan-Willem Romeijn: ‘Measurement error or not, CERN neutrino research provides valuable insights’

Whether or not neutrinos travel faster than light, the controversial ‘discovery’ by CERN will result in valuable insights, according to philosopher of science Jan-Willem Romeijn. If the findings are right, important scientific insights will have to be adapted. If they are not, they will form interesting study material for philosophers of science, thinks Romeijn. ‘What exactly do we expect from science? And what is it actually capable of? The “neutrino discovery” could provide interesting answers to such questions.’

At the end of September, researchers at the European research institute CERN in Geneva announced that measurements had revealed that neutrinos can travel faster than light. If true, this would call into question one of the cornerstones of present-day physics, Albert Einstein’s theory of relativity. A storm of criticism followed. The CERN measurements were not exact enough, critics claimed, and the research institute was publishing unfounded results in a hunt for publicity and prestige. Philosopher of science Jan-Willem Romeijn sees mainly the positive, interesting aspects of the supposed discovery and the wave of publicity it generated.

No such thing as a revolution

Romeijn thinks that the CERN discoveries being treated as an unparalleled scientific breakthrough immediately after the announcement is illustrative of the human tendency to romanticize scientific revolutions. ‘Every now and again we seem to need a new story, an exciting new view of the world. The fact that real life is often much more nuanced, and that scientific advances are usually very gradual, is conveniently forgotten.’

The same sort of thing happened even with Einstein’s discoveries, Romeijn explains. His idea to visualize energy as small packages, thus taking the first step towards quantum mechanics, had already been applied by Max Planck as a calculation trick. It was Einstein’s step that was eventually considered to be revolutionary, though. Romeijn: ‘The chances are small, but let’s say that the CERN measurements are correct. Then our view of the world would have to change, but not to the extent of a complete volte face. Thus far Einstein’s insights have been extremely successful. The search would be on to find an elegant way to preserve them and to incorporate them into the new insights.’

Food for philosophers and sociologists

Even if the CERN findings turn out to be based on measurement errors, which is being assumed by many scientists, the case will result in many valuable insights, states Romeijn. As long as the mistake is not a stupid one, the physicists involved will be able to refine their technical setups and measurement techniques. And philosophers and sociologists of science will also benefit, thinks Romeijn. ‘The issue is a beautiful illustration of how social processes within science function, and how the announcements of the discovery were picked up and magnified. And just look at how eagerly the media fell on the story – that is an interesting phenomenon too.’

Science: scoring points off each other?

What is science capable of? Can it really provide insight into reality, or is it not much more than a series of ‘agreements’ between learned ladies and gentlemen about what they regard as reality? Or is it mainly a rather nice way of gaining status? Romeijn thinks that the neutrino discovery can

also provide insight into this kind of philosophical issue. His personal view of science is optimistic. ‘Of course science is the work of humans. Some “facts” are based on nothing more than consensus in a research community. And sometimes researchers claim success to win grants and acquire prestige.’

Romeijn considers it unjust to criticize the CERN researchers for this. ‘In my view they’ve really gone out on a limb. They have published results they don’t properly understand themselves, with the request that other institutions examine and assess them. This is an illustration of how in an ideal case science, even if it is a supremely human undertaking, can reveal the world around us. I consider science to be a debate where people do not take the wind out of each other’s sails or score points off each other but continually correct each other and keep each other on course.’

#### Curriculum Vitae

Dr Jan-Willem Romeijn (1975) is a University Lecturer and conducts research in the field of statistical arguments and philosophy of science. He graduated with honours in physics and philosophy from Utrecht University and was awarded a PhD with honours in philosophy by the University of Groningen for a study of Bayesian logic. NWO, the organization for scientific research, awarded him a prestigious Vidi grant last year to research the meaning of probability percentages, used on a daily basis by virtually everyone. He is currently researching at Carnegie Mellon University in Pittsburgh (US).

Note for the press

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