Ongoing problems with Special and General Relativity, and Solutions

ALBRECHT GIESE

Hamburg, Germany
phys@a-giese.de

Einstein's theory of special relativity has been discussed controversially ever since it was first proposed. Serious objections were raised by Einstein's colleagues Ernst Mach and Hendrik Lorentz. They objected that Einstein's interpretation, the denial of an absolute frame of reference (i.e. ether), leads to logical conflicts with regard to circular motion. Einstein accepted this as a problem, yet nevertheless refused to accept the necessity of an ether, while at the same time failing to give an answer to the arguments put forward by Mach and Lorentz.

We are having two experiments, one Gedanken experiment and another one performed. The Gedanken experiment was described by Lorentz in a letter to Einstein in 1916. Lorentz assumed a standing wave in a conductor which was positioned around the equator of the Earth. Lorentz pointed out to Einstein that the notches of the wave would not follow the rotation of the earth. And he asked Einstein to what these notches are oriented if not to an absolute frame. Einstein could not answer the question but insisted in not having an absolute frame.

The other experiment is the known fiber gyroscope used in today's navigation systems. It is based on the Sagnac experiment and works with such clear results that the common logical controversy about Sagnac does not affect the questions with respect to relativity.

The consequence of both experiments is that the abstinence of an absolute frame causes insoluble conflicts. Einstein's postulate that the speed of light is the same constant in all frames is clearly falsified. And the Lorentzian version of relativity is the only working solution.

The Lorentzian interpretation of relativity, which assumes a fixed reference system, avoids these problems. In addition, the general approach of Lorentz, which does not refer to a modified understanding of space and time but deduces relativistic phenomena from known physical reactions, avoids these problems as well as other known paradoxes of special relativity.

Furthermore, when Lorentz's basic understanding is applied to general relativity, this leads to a different understanding of gravity. In this interpretation, the gravitational force does not depend on mass or on energy, but is a side effect of the forces acting in elementary particles. As a consequence, every particle contributes equally to the gravitational field independently of its mass. This approach solves the problem of Dark Matter without the need for special particles. It also solves the great problem of Dark Energy in a comparatively simple way.

The German philosopher Hans Reichenbach who cooperated with Einstein for some time made the following comparison. He has set Einstein's relativity in relation to the Ptolemaic system of planetary motion and Lorentz' relativity to the Copernican system. This comparison describes the situation correctly also in so far as the Lorentzian relativity is considerably simpler than the Einsteinian. And it solves open problems as mentioned above.