

## Who can run faster than light?

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OPERA is a particle physics detector, built inside Gran Sasso mountain in Italy. Built by CERN-LNGS collaboration, this experiment was meant to detect and study very rare interactions of tiny particles called Neutrinos. This collaboration has recently shocked the world by its discovery that neutrinos can travel faster than light. If confirmed by other researchers, this result will pose a serious threat to Einstein's general theory of relativity.

Contrary to our perception that discovery of this significance must have been facilitated by some technological breakthroughs; it was result of deployment of seemingly simple and certainly well known technologies. The neutrinos produced by the CERN accelerator are beamed towards the OPERA detector, which travel through an earth crust of about 730km before being detected. What remains to arrive at an exact velocity of neutrinos is to measure the distance travelled and the time taken by them to reach OPERA. Both of these simple parameters are measured with unprecedented accuracies using a well known GPS technology.

This talk will highlight significance of this discovery; describe technical details of the experiment as well as the measurements obtained using an out-of-the-box technology.

### About the Speaker:

Dr. B.Satyanarayana did his B.Tech in Electronics and Communication Engineering from J.N.T. University, Hyderabad and Ph.D. in Physics from IIT Bombay. His area of specialisation is detectors and instrumentation for high energy physics experiments. He has vast experience of 30 years in designing modern detectors, ultrafast electronics and large data acquisition systems for many mega science experiments in India and abroad.

He published more than 100 papers and proceedings in national and international journals of repute and delivered more than 80 invited talks, lectures and seminars at many prestigious conferences and venues. He won Gowri Memorial Award (by IETE) and is a member of the Editorial Board of International Journal of Physics and Mathematical Sciences.

Dr. Satyanarayana is a fellow/member of many professional bodies, including Institution of Electronics and Telecommunication Engineers (New Delhi), Institute of Engineers (Kolkata), Instrument Society of India (Bengaluru), Indian Physics Association (Mumbai), Institution of Electrical and Electronics Engineers (USA), IEEE Nuclear and Plasma Sciences Society (USA), IEEE Communications Society (USA).