

India's black hole pioneer, Vishveshwara, is no more

Bangalore/New Delhi, January 17: Prof C V Vishveshwara, pioneering black hole physicist who specialised in Einstein's General Relativity theory and worked extensively on the theory of black holes and gravitational waves for decades, has passed away. He was 78.



Way back in 1970, Vishveshwara had made theoretical contributions to understanding of black holes and generation of gravitational waves. In binary black holes, gravitational waves are emitted at twice the orbital frequency and carry away the binary's energy and angular momentum. Since the system loses its rotational energy, two black-holes gradually swirl closer and emit even more radiation, which in turn accelerates the swirl. This produces a characteristic chirp waveform whose amplitude and frequency both increase with time until eventually the two bodies merge together. Just before the merger the relative velocities would approach close to that of light.

The merger will result in a highly deformed single daughter black-hole. The daughter black-hole will emit gravitational radiation that is characteristic of the mass and spin of the final black-hole. This is called the quasi-normal mode or the ring-down signal. The ring-down signal is like radiation from a bell that is stuck with a hammer.

Vishveshwara made theoretical contributions to understand how such blackholes may collide into each other. He also showed that gravitational waves scattered off a blackhole would have the characteristic wave form of quasi-normal mode or the ring-down signal. It is this very same wiggle that has been found as the signature of the gravitational wave. His research work was published in top research journal, *Nature* in 1970.

After doing MSc in Bangalore, he went to Columbia University for higher studies. Working on stability of the Schwarzschild black hole with Prof Charles Misner, he obtained his PhD from the University of Maryland. In addition to his proof of black-hole stability, he has made pioneering contributions to black-hole physics.

After serving on the faculty of several universities in America, he returned to Bangalore and joined Raman Research Institute and later became a Senior Professor at the Indian Institute of Astrophysics. He was also founder-director of the Jawaharlal Nehru Planetarium in Bangalore.

His books, *Einstein's Enigma or Black Holes in My Bubble Bath* and *Universe Unveiled – The Cosmos in My Bubble Bath* are widely acclaimed.

(Indian Science News and Feature Service)

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Interview with Prof C V Vishveshwara telecast on Rajya Sabha TV:

<https://www.youtube.com/watch?v=gw9BQvkafSA>