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A Bangalorean helped physicist calculate time

The American Went On To Win Physics Nobel

Rhik Kundu | TNN

Bangalore: American physicist David J Wineland, who along with French scientist Serge Haroche won the 2012 Nobel Prize for his works in quantum physics, has a Bangalore connection. This link, incidentally, contributed significantly to the works that eventually got the physicist the honour.

Dr Bhanu Pratap Das, the top boss of the city's Indian Institute of Astrophysics, has known Dr Wineland since 1984 when both were involved in academic works in the National Institute of Standards and Technology (NIST) at Colorado, US.

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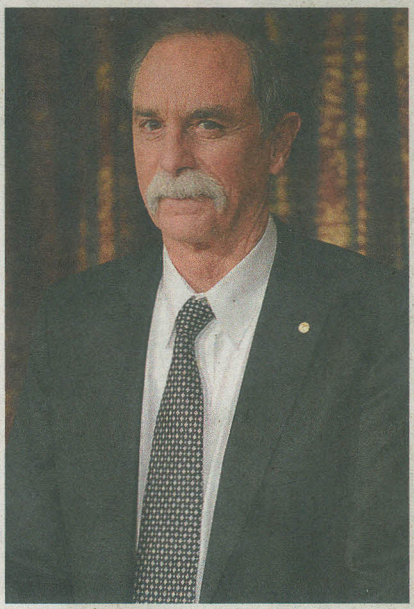
The scientists share a common interest: developing extremely precise clocks. They kept in touch after Das moved back to India.

According to Das, Cesium ions were used to measure time accurately until scientists like Wineland started using aluminum ions which got better results. "The time taken by a Cesium ion to give out a frequency of 9192631770 Hz was considered the most accurate calculation for a second," he said, "until the scientists started experimenting with aluminum ions."

In 2010, Wineland asked Das to reduce the error in calculating time. "He was not very sure whether the black body radiation figures which are instrumental in calculating a second were correct or not," Das said. Blackbody radiation refers to an object or system which absorbs all radiation incidents upon it and re-radiates energy.

Das, his former students, HS Nataraj and BK Sahoo, and their two foreign research collaborators, Lucas Visscher and Mihaly Kallay, concluded their theoretical experiments in less than a year. "Our Blackbody Radiation Shift calculation had reduced the systematic error by about 28%," said Das.

Das's work was published in a journal in March 2011. The next year, Wineland's work based on conclusions of Das, fetched the American physicist the Nobel for 'ground-breaking experimental methods which enable measuring and manipulation of individual quantum systems'.



BRAIN BEHIND: Physicist David J Wineland

What the Nobel was for

Wineland's finding has enabled scientists take the "first steps towards building a new type of super fast computer based on quantum physics. Perhaps the quantum computer will change our everyday lives in this century in the same radical way as the classical computer did in the last century. The research has also led to the construction of extremely precise clocks that could become the future basis for a new standard of time, with more than hundred-fold greater precision than present-day caesium clocks", the Royal Swedish Academy of Sciences said.