

KODAIKANAL OBSERVATORY MARKS 125 STELLAR YEARS

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PERCHED high on Palani Hills, the Kodaikanal Solar Observatory (KSO) is a sentinel of the sun, a hub of scientific discovery, and more recently, a jewelled hilt in India's space ambitions. And this year, it turns 125.

A significant factor in the observatory's success has been its unique location. "KSO sits at an elevation of over 2,300m and enjoys a pristine view largely unaffected by atmospheric disturbances," said M Rajalingam, the engineer-in-charge.

Colonial roots

The story of how the observatory got there begins with William Petrie, an officer in the East India Company (EIC), and his interest in tracking celestial bodies. The fascination caught on, and in 1789, the EIC decided to set up an observatory in Madras "for promoting the knowledge of astronomy, geography and navigation."

By early 19th century, Madras Observatory was a leading astronomical centre renowned for its work on star positions and its discovery of a new line in the sun's spectrum, later identified as helium, in 1868.

However, the region's low altitude and increasing urbanisation prompted the need for a better-suited location for solar observations. Extensive surveys later, and in the summer of 1899, John Eliot, the meteorological reporter, established the observatory in Kodaikanal. "It was designed to facilitate both day and night observations," Rajalingam said. Charles Michie Smith was the first to head the facility.



8 inch telescope at Kodaikanal Solar Observatory | IIA ARCHIVES

Breakthroughs and discoveries

By 1901, KSO was conducting regular solar observations, meticulously documenting sunspots and solar flares. At the time, it boasted state-of-the-art instruments, including a 6-inch Cooke astrograph, an 8-inch visual telescope, and a 20-inch reflector.

A pivotal moment came in 1904 with the installation of a spectroheliograph, a marvel of its time, under Charles Michie Smith.

"This instrument allowed scientists to explore the sun's chromosphere with unprecedented detail. In 1909, John Evershed put it to good use for his groundbreaking discovery — what we today call the Evershed Effect," said Kumaravel P, a senior technical officer.

Over the years, the 113-acre campus saw the addition of modern instruments like the spectropolarimeter, twin telescopes, and an H-alpha telescope, pushing the boundaries of solar research.

A treasure trove

KSO's legacy also lies in its meticulous daily recordings of solar activity, creating one of the most extensive solar archives in the world.

"These recordings, spanning over a century, have created a treasure trove of information," said Prof Annapurni Subramanian, the director of the Indian Institute of Astrophysics.

Solar observations are preserved using photographic plates, capturing images of the sun in various wavelengths, including white light, H-alpha, and the Calcium

K-line. Their data provides invaluable insights into solar cycles, sunspot activities and solar flares.

Since the early 2000s, KSO has also undertaken the daunting yet necessary task of digitising this data, thereby making it accessible to the global scientific community. P Manikandan, entrusted with this work, is the fourth-generation member of his family to work with KSO.

"My great-grandfather worked with Evershed," Manikandan revealed.

The legacy continues

Today, KSO remains at the forefront of solar research. Nearly a dozen researchers focus on studying the 11-year solar cycle, including sunspot variations and solar activity such as flares and prominences. Next year, the sun is anticipated to reach a peak of activity known as maxima, hailing solar flares and coronal mass ejections towards the earth.

"Understanding our sun is more crucial than ever, given its implications on technology and climate. In that regard, KSO's contributions are invaluable," Annapurni said.

A significant future project is KSO's involvement in the National Large Solar Telescope at Merak in Ladakh, set to be the largest in the country.

To celebrate its 125-year legacy, KSO has planned a slew of activities, including an international conference next January, which will bring together solar astronomers from around the world. "Let the work we do here inspire a new generation of scientists to gaze skyward," said Annapurni.



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