

Panorama

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'Aditya' to study outer atmosphere of the sun by 2012

The Inquirer



As 'solar physics' gets as vital as climate change studies, the solar observatory in Kodalkanal hills in Tamil Nadu offers a unique window to space studies today. It has over 100 years of rich recorded data, next only to the Greenwich Observatory in the UK. The observatory looks ahead to more productive and exciting times as new projects and exploratory avenues open up in the Indian firmament, asserts senior Indian Institute of Astrophysics scientist and the observatory's scientist-in-charge, Dr K Sundara Raman, who holds a doctorate in solar physics. He spoke to M R Venkatesh of *Deccan Herald*.

How has the Kodalkanal observatory evolved with its core focus?
The construction of the Kodalkanal Obser-

vatory (KO) began in the year 1891 when the then British rulers decided to shift the Madras Observatory to Kodalkanal. It took seven years to complete the buildings and other things and the first observations of the sun commenced from April 1, 1899. So it has more than 100 years of very rich solar data.

We have optical telescopes for studying the sun, being put up at an altitude of 7,698 feet above mean sea level, as the atmospheric conditions are suitable for solar studies.

The solar telescopes we have are entirely different from the conventional telescopes to study the stars. The solar telescopes have an array of mirrors followed by a lens to get the image of the sun. It gives one of the largest images of the sun in Asia, 340 mm of diameter in size. But mind you, one mm of the image corresponds to 4,000 km on the sun!

When KO was completed in 1898, it was then under the meteorological department. After its bifurcation, KO later became part of the Indian Institute of Astro-



Dr K Sundara Raman

physics (IIA) in 1971. The renowned stellar and astrophysicist Dr Vains Bagpu, who first joined the KO, took initiatives for having an exclusive observatory facility for the study of stars, which came up at Kaval-

ur in 1974 (near Vellore).

As IIA's key arm, how have KO's sun studies catalysed recent developments in solar physics and astrophysics?

Though at KO we have a solar tower tunnel telescope which gives one of the largest images of the sun in Asia, the atmospheric turbulence would still be distracting them. Atop the Kodalkanal hills we get a very clear and static image. But if you want images totally free from atmospheric effects, you have to go to space. And hence, we at IIA are going to have our own indigenous built space observatory, 'Aditya' expected to be launched by ISRO in 2012, carrying an IIA payload among others, to study the sun.

'Aditya' in particular will facilitate the study of the outer atmosphere of the sun called the solar corona, the temperature dynamics at the sun surface, besides unsolved problems like temperature increasing as you go away from the sun, phenomena like coronal mass ejections (CME), solar flares, changes in solar activity etc.

These have important implications for the earth's atmosphere, as for example solar flares thrown out of the sun can pose a threat to our orbiting satellites. Hence, world-over study of space weather is getting very important.

The data from our own space observatory will be an enormous addition to study these phenomena. Yet, you still need the support of ground-based observations, as optical observations from KO and other solar observatories play an important complementary role in determining the conditions that trigger solar flares, CME, etc. We have joint programmes as well to study these phenomena with various universities, research institutions and with the NASA in the USA also.

Any significant findings during the recent annual total solar eclipse?

Yes, we have made several observations regarding the solar flares, 'CME' and we have our students working on these data. The magnetic instability that happens in the solar active regions, how they grow

and decay are all studied elaborately. In fact, the sun is monitored every day and all these phenomena are analysed and published by us as results.

How do you get more youth on board this fascinating cosmic journey?

To attract more students, the IIA and KO conduct four schools—summer and winter schools—in a year targeting the final year B.E., B.Tech, M.Sc students and one international school in winter for second year doctoral students in the field of solar physics. In addition, we have internships for them which could run up to six-months.

Further, ISRO's Indian Institute of Space Technology in Thiruvananthapuram has thrown up new opportunities for our youth in research; various other institutions offer very attractive fellowships, courtesy Department of Science and Technology. So there are lots of fruitful openings for our youth now as powers that be have realised that basic science and research is necessary for applied science.