

Scientists At India's Physical Research Laboratory Embark On Planet Hunting Mission

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AsianScientist (Jan. 11, 2012) - Apart from aiming at the moon and Mars, Indian space scientists have embarked on a mission unknown to many - hunting for planets several tens of light years away (10 to 100 light years away), some of which may even lie within the habitable zone.

This exciting study is taking place at the nearly 35-year-old Mount Abu observatory, situated at an altitude of 1,680 meters and part of the Ahmedabad-based Physical Research Laboratory (PRL), an ISRO affiliate. The Indian space program, which will celebrate its 50th anniversary in November 2013, had its early beginnings at the PRL.

Speaking to *Asian Scientist Magazine*, Abhijit Chakraborty of PRL's astronomy and astrophysics group, who is leading a team of five young scientists and engineers on this project, said that the program was started in 2007 when a decision was taken to build a spectrograph.

“The main purpose of the spectrograph is to detect what is known as a stellar wobble. If our spectrograph finds that a star is wobbling it indicates that there is a planet around it,” he said.

The Indian planet-hunters have teamed up with Penn State University in the United States and the Geneva Observatory in Switzerland. Chakraborty said that scientists from the Geneva Observatory were the first to detect a planet around a star in 1995. The scientists involved from Penn State University are of Indian-origin.

The spectrograph - which is connected to the 1.2 meter telescope through fiber optic cables - is undergoing tests at the moment, he said. Once it becomes fully operational, he expects that the instrument will be able to detect a 'star wobble' and therefore the existence of a planet around it.

“Right now we are trying to establish our detection limit,” he stated.

The team is expected to begin its search provisionally in 2013-14 using the current 1.2 meter telescope.

“There is a high probability that by 2016-2017 the observatory will acquire a larger telescope of 2.5 meter diameter. If this plan materializes, the project will be globally competitive making it possible to detect planets in the habitable zone,” he said.

Chakraborty said he himself designed and assembled the spectrograph which is kept under vacuum and

temperature control. The 2 x 2 x 1 meter spectrograph comprises custom-made optical mirrors, lenses, a huge prism, a large grating, and a very sensitive array detector.

“The individual optical components are very sensitive with more than 97 percent reflectivity or transmission,” he said.

If the scientists detect a planet, it promises to be another landmark achievement by India's space program after the discovery of water on the moon by Chandrayaan-1 in November 2008.

The work at the Mount Abu observatory assumes significance in the context of NASA's Kepler mission discovering new planets, of which 54 are in the habitable zone.

He said that the difference between NASA's Kepler mission and ground-based spectrographic surveys is that while the former has the capability to measure the size of the prospective planet, the latter is the only method by which the mass of the planet is determined.

According to Chakraborty, therefore, each of Kepler's prospective planet candidates have to be confirmed by similar ground-based experiments. Around the world, there are only a few groups engaged in such ground-based confirmations.

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