Birmingham Engineers Make New Devices To Look Deeper Into Space

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A new technology developed by University of Birmingham scientists is enabling astronomers to observe in more detail some of the most distant and spectacular phenomena in the universe without needing to build bigger telescopes.

Professor Mike Lancaster and his team at the University's Department of Electronic, Electrical and Computer Engineering are using futuristic materials called superconductors to build filters for radio telescopes that make them more sensitive to distant objects such as rapidly rotating pulsars and remote, evolving galaxies.

In collaboration with astronomers at the Jodrell Bank telescope and other major observatories in the US and Australia, Professor Lancaster has been developing relatively inexpensive, 'plug and play' devices that allow the incredibly weak signals from cosmic bodies trillions of miles from Earth to pass unhindered but screen out any unwanted interference from terrestrial sources such as mobile phones and television transmitters.

Mike Lancaster explains, *'Our filters are able to distinguish between the signals coming from a remote star and those from a local mobile phone by homing in on the precise frequencies we require. It's like a narrow radio turnstile shutting out intruders.'*

Birmingham is at the leading edge of high-tech devices using superconductors which are materials that lose no energy when an electric current is passed through them. Superconducting filters capture far more of the incoming signals than conventional copper, as well as cutting out unwanted signals without interfering with the signals that the scientists want to receive.

A further advantage is economic. To look deeper into space, it has in the past been necessary to build bigger radio dishes at great cost. However superconducting filters cost just a few thousands pounds and can be built into existing instruments to make them look farther and faster.

Funded by a Portfolio Partnership grant from the Engineering and Physical Sciences Research Council, the researchers are looking to the time when filters can be tuneable to meet changing circumstances.

Professor Lancaster continues, *'If a plane were to fly over a radio telescope we can stop it interfering with the signals coming from space simply by using the superconducting filter in the same way that a radio set only receives one channel at a time.'*

This year scientists at Birmingham are acknowledging the 21st anniversary of the discovery of superconductivity above the boiling point of nitrogen.

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Notes to Editors

For further information

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