



Growth of radio astronomy at TIFR, India

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Firstly I plan to describe briefly growth of the Radio Astronomy group that was established at TIFR, Mumbai, in early 1963. The Ooty Radio Telescope (ORT) was designed and built indigenously and became operational in early 1970. It consists of a 530m long and 30 m wide parabolic cylindrical antenna that is located on a suitable hill with its axis of rotation parallel to that of the Earth, which allows it to be steered mechanically in hour angle for about ten hours. A phased array allows coverage from - 45 to + 45 degrees in declination. Using the lunar occultation observations, angular size of over 1000 radio galaxies with arc-second resolution were made by 1976 for the first time in the world. The observations supported the Big Bang model. An Ooty Synthesis Radio Telescope (OSRT) was operational during 1982-1986. Currently, ORT is being used for Inter-planetary Scintillation observations of compact radio galaxies and Quasars for daily measurements of the velocity of the Solar wind. An active programme for observations of Pulsars is also carried out.

In 1979, it was proposed to construct a Giant Equatorial Radio Telescope (GERT), consisting of a 2 km long and 50 m wide parabolic cylindrical antenna located close to the Earth's Equator, firstly in Kenya and later in Indonesia, but support from respective governments was lacking.

In 1984, I proposed the Giant Metrewave Radio Telescope (GMRT) to investigate certain outstanding astronomical investigations that can be studied only at metre wavelengths e.g. the red-shifted emission of the neutral Hydrogen from distant galaxies and also those that can be best studied at metre wavelengths, e.g. PULSARS. GMRT consists of 30 fully steerable parabolic dish antennas, each of 45 m in diameter. Fourteen antennas are located in a central array of nearly one square km size and other sixteen antennas are located in a Y-shaped array of nearly 25 km in extent. GMRT electronics allows observations in five frequency bands centred at ~ 150, 235, 325, 610 and 1250 MHz, with a bandwidth of 32 MHz. Observations over ~ 10 hours allows sensitivity of tens of micro-Jansky. GMRT became fully operational in 2000. During the last 18 years, GMRT has been used for observations over wide range of celestial objects, ranging from nearby Venus, Jupiter, objects in our Galaxy, to the most distant radio galaxies and QSOs. Many important discoveries have been made during the last 18 years. I will describe a few.

Recently, GMRT has been up graded to cover a wide frequency ranging up to ~ 400 MHz (uGMRT) that has increased its sensitivity by a factor of about 3, as will be described by Prof. Yashwant Gupta later in this Conference.