

Global telescope array links successfully with GBT

May 9 2014, by Charles E. Blue

For the first time, the National Science Foundation's Green Bank Telescope (GBT) was successfully linked with a network of millimeter-wavelength telescopes, giving a powerful boost to an observatory known as the Global Millimeter VLBI Array. (VLBI stands for Very Long Baseline Interferometry, a technique that allows many widely spaced radio antennas to function as a single telescope.)

An international team of astronomers used this supercharged array to peer into the center of the giant elliptical galaxy M87, which is famous among astronomers for its prominent jet of energetic particles that stream away from its central black hole.

The 100-meter GBT is the world's largest fully steerable radio [telescope](#) and the largest single-dish telescope capable of millimeter-wavelength observations. It joined in this international observation to help test two theories of how black holes accelerate material into jets. If the results reveal a change in shape near the base of the jets, from parabolic to conical, then it's believed that they are powered by two separate forces: the magnetic field in the accretion disk and the centrifugal force of the material in the [accretion disk](#). If the shape of the jets is more uniform, then the particles are likely accelerated by the high pressure the material experiences when it falls into the black hole.

The Global Millimeter VLBI Array normally consists of 13 stations spread across the globe from the United States (including the NRAO's Very Long Baseline Array), to six stations located in Europe. The GBT

provides seven times the signal of the next biggest participating telescope. During its inaugural observation, the GBT was selected as the reference antenna because it provided the best and most stable signal. "The addition of the GBT to the GMVA will allow scientists from all around the world to study weaker objects and image material closer to [black holes](#) in the center of galaxies," said NRAO astronomer Toney Minter.

More information: public.nrao.edu/telescopes/gbt

Provided by National Radio Astronomy Observatory

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