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THE BERKELEY SETI PROGRAM: SETI@HOME, SERENDIP, AND OPTICAL SETI

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We present results from two radio and two optical SETI programs at the University of California, Berkeley.

The SERENDIP IV sky survey searches for narrow band radio signals at the 300 meter Arecibo Observatory in Puerto Rico. The program uses a 168 million channel spectrum analyzer, running in "piggyback" mode, using a dedicated receiver to take data 24 hours a day, year round, without interfering with the telescope's ongoing observations. The SERENDIP IV sky survey covers a 100 MHz band centered at the 21 cm line (1420 MHz) and covers declinations from -2 to +38 degrees.

Berkeley's newest SETI project is SETI@home, which uses desktop computers of over a million volunteers to analyze 50 Terabytes of data from Arecibo Observatory. The SETI@home sky survey is 10 times more sensitive and searches a much wider variety of signal types than SERENDIP IV but covers only a 2.5 MHz band. Participants download a screen-saver type program from the Web, and data from the Arecibo radio telescope is distributed via the Internet to this program. The program analyzes the data, searching for narrow-band continuous and pulsed signals. SETI@home is the largest supercomputer on the planet, currently averaging 12 Teraflops. The two million SETI@home participants have contributed 300,000 years of computing time since the project began a year ago.

The optical pulse search looks for extremely short bright pulses that might last a billionth of a second or so, perhaps transmitted by a powerful pulsed laser operated by a distant civilization. The target list includes nearby F, G, K, and M stars, plus a few globular cluster and galaxies. The pulse search utilizes Berkeley's 30-inch automated telescope at Leuschner observatory with a pair of ultra high-speed photomultiplier tubes and coincidence detector.

The other Berkeley optical SETI program searches for laser signals that are on continuously, or at least on a large fraction of the time. This program searches 1000 stars for narrow band coherent signals. The very high-resolution spectra are taken by Marcy and his colleagues as part of their on-going search for planets at Lick, Keck, and the Anglo-Australian observatories. All of the spectra are carefully examined for ultra narrow band features, since artificially generated emissions, such as those from a laser beams, are very narrow compared to relatively broad natural emission lines.