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ere are a few comments about pulsars and a new GB dish:

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The key word is Sensitivity.

There are three broad areas of research: searches for new pulsars, timing known pulsars, and other pulsar investigations.

Searches will always be limited by sensitivity at decimeter wavelengths. There are some  $10^{15}$  pulsars in our galaxy and we have detected less than 500. Assuming optimum receiver/feed technology, sensitivity is established by collecting area. Collecting area is probably optimized at decimeter wavelengths by an array -- the increased complexity of electronics is offset by decreased cost of elements. For some the array may provide flexibility for decimeter multibeaming, while for others there is the loss of a clean beam; perhaps it's a draw. Complete declination coverage is essential, while tracking beyond a few hours is a luxury. At 75 cm there are 77,500 beam areas over half the sky; one can survey these with 10 minutes per beam using a 10 beam instrument in 54 days. The primary field of 0.5 sr along the plane could be surveyed at 21 cm in the same amount of time.

Timing of pulsars has become an increasingly broad field with implications in fundamental physics, interstellar medium dynamics and space geodesy. The pulsar timing array experiment that we are conducting on the 140ft telescope is an attempt to establish a reference frame of millisecond and binary pulsars around the sky. This data will be modeled by standard parameters for the individual pulsars and global parameters for time, space and a primordial gravitational wave background. The global parameters have monopole, dipole and quadrupole signatures over the sky. The quality of this data is ultimately limited by the sensitivity of the 140ft at decimeter wavelengths, although at present we are limited by funds and effort required to construct data acquisition hardware that uses the full bandwidth presently available. In our most recent 140ft observation we detected a decrease in the dispersion measure of PSR 1937+21 by using observations spanning 800-3200 MHz. Multifrequency capability for monitoring is essential. Observing an array of pulsars does not require full hour angle tracking; in particular observing the globular cluster pulsars 1620-26 and 1821-24 is necessarily restricted to several hours per day at the latitude of the 140ft.

Other pulsar studies cover a wide range of activities. While studies of the intrinsic properties of pulsar radiation have been few in recent years, there continue to be good projects considered. Use of pulsars to investigate the microscale properties of the interstellar medium have produced many exciting new results in recent years. These complement parallel attacks using VLBI techniques and source variability studies. Full declination coverage is essential and of course sensitivity. In this case sensitivity cannot be replaced by bandwidth because many of the phenomena studied are narrow band processes. Unlike the areas of research discussed above long hour angle coverage is often useful for these other' pulsar studies.

I conclude that the possibility of a 300ft/140ft replacement with regard to pulsar studies is best satisfied by a decimeter antenna array with total collecting area equivalent to a 140m dish (root 2 times 100m). Optimization of receiver/feed is assumed. Full declination range and limited hour angle coverage (~4 hr) is required. Hopefully this could be done for a fraction of the cost of the VLD 70m. Perhaps there is room for a hybrid solution of one element of the array working to higher frequencies.