**Radio Transients: Exploring Axes of Discovery**

James M. Cordes
Astronomy Department, Cornell University

The time domain is recognized to be an important dimension in the overall phase space of variables that characterizes the observable universe, particularly with regard to flux variability. Examples abound across the electromagnetic spectrum and in non-photonic astronomy (neutrinos, gravitational waves). However, while we can glimpse the richness of time-domain phenomena at radio wavelengths, the radio sky is largely unexplored in any comprehensive sense, especially when compared to the successes of wide-field surveys at high energies. Known radio transients are as short as 0.4 ns with astronomically large equivalent brightness temperatures related to the coherent nature of pulsar radiation; others with incoherent emission extend to hour and longer time scales with thermal brightness temperatures. Some time domain properties are intrinsic to sources while others are imposed by multipath propagation through intervening plasma. I will discuss both the known and speculative aspects of the radio transient sky, with an emphasis on discoveries that can be made with new, appropriately designed instrumentation and telescopes. A generalized survey figure of merit will be presented that takes into account the rate and duration of transient celestial events. The key for expanding discovery space is a wide field of view combined with adequate sampling of the time and frequency domains and with adequate sensitivity. I also discuss implementation of time-domain studies as an integral part of synoptic survey modes and the potential for cross-wavelength and joint photonic/non-photonic studies. We can expect great advances to be made with continuing Arecibo and Parkes surveys followed by those with the EVLA and with pathfinder arrays for the Square Kilometer Array, including the LOFAR, LWA, MWA, MeerKAT and ASKAP.