

# Issues for Studies of Radio Transients with the Square Kilometer Array

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The Square Kilometer Array (SKA) is conceived as the next generation radio telescope for discovery and analysis of the radio universe. A large volume of observational phase space that is only cursorily characterized so far but which will be opened up by the SKA concerns radio transients. Compared to surveys at high energies, the radio transient sky is very poorly known. To unveil the transient radio sky requires specific capabilities of the SKA that influence its design.

Transient sources are expected on all scales, ranging from solar system to Galactic to cosmological. Known radio objects show variations and bursts on time scales ranging from nanoseconds to years. It is almost certain that new classes of sources will be discovered with the SKA. I will discuss the kinds of signals expected, taking into account the differences between coherent and incoherent signals and intrinsic versus extrinsic causes of variability.

Giant pulses from objects such as the Crab pulsar provide one prototype for detection of fast transients on sub-millisecond time scales. I will discuss some of the phenomenology of giant pulses and an attempt (with M. McLaughlin) at detecting giant pulses from pulsars in M33. Radio frequency interference currently limits our ability to detect such extragalactic pulses. I will discuss potential remedies for contamination by RFI involving multibeam and multistation observations. SKA specifications and operating modes for transient surveys will be summarized.