

Overview and Initial Results from the LIGHT project

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Abstract

Long-Period Transients (LPTs) are a recently identified class of coherent radio sources with pulse durations of several seconds to minutes and periodicities ranging from minutes to hours. Their origin remains uncertain, and their unusual emission properties may point to previously unexplored populations of compact objects. Most LPTs discovered to date have been identified through image-domain searches, motivating systematic exploration of archival interferometric observations. We present the Long-period transients in GMRT archIval daTa (LIGHT) project, a systematic search for LPTs using archival interferometric observations from the upgraded Giant Metrewave Radio Telescope (uGMRT). LIGHT employs an automated end-to-end pipeline for calibration, imaging, image-domain transient detection, and Fast Folding Algorithm (FFA)-based periodicity searches. The pipeline has successfully recovered several known LPTs, validating its performance, and has identified multiple promising LPT candidates currently under investigation. In addition, the survey has recovered numerous known pulsars, RRATs, and magnetars as in-field sources, demonstrating its robustness and sensitivity to a broad range of coherent radio emitters. We present the current status of the survey and discuss its potential to constrain the Galactic population of long-period radio transients while demonstrating the scientific value of archival interferometric data for discovering rare radio sources.