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Searching for Solar System Technosignatures with Rubin/LSST

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This work is a proposal to perform preparatory work to maximize the information that will be obtained from the Rubin Observatory Legacy Survey of Space and Time (LSST). The work will expand LSST results into the domains of technosignature searches in the inner Solar System, and the study of dark comets, which are minor planets that show significant activity-related non-gravitational accelerations (NGAs) without showing evidence of comae or tails. We will use simulations of LSST data to calculate the survey's sensitivity to NGAs as a function of object size, magnitude, and orbital elements. We will also determine how well LSST can identify NGAs given the difficulties of linking objects, and improve the linking algorithms. Additionally, we will develop a system to alert users when there is evidence of activity or NGAs in moving objects, particularly when objects appear to go "missing" due to changes in brightness or NGAs. These steps will enable us to use LSST to establish rigorous upper limits on the existence of free-floating extraterrestrial technology in the inner Solar System, narrowing the parameter space in which such objects could exist without having been detected already.