How do starts gain their mass?: A transient search for variable protostars

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Low-mass stars form via gravitational collapse of molecular cloud cores. Although their formation has received considerable attention in the last few decades, the rate at which a star gains most of its mass and the physics that drives the main phase of stellar growth is still not understood. Most protostars have luminosities significantly fainter than the luminosity
expected from steady accretion over the protostellar lifetime. The solution to this problem may lie in episodic mass accretion -- prolonged periods of very low accretion punctuated by short bursts of rapid accretion. However, the timescale and amplitude for variability at the protostellar phase is almost entirely unconstrained. Our long-term JCMT/SCUBA2 monitoring program of eight nearby star forming regions is now providing measurements for accretion variability of protostars to understand the physics of the disk instabilities that drive this variability. The selected fields include enough bright sources to allow for relative flux calibration to an accuracy of ~3% rms. Our first detected sub-mm variable has a periodic lightcurve, likely modulated by the dynamics of an embedded binary system with a disk. This program is the first large, targeted survey for sub-mm variability and is opening up a new field of study.