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Large Submillimeter Telescope (LST): 1) Concept and Science Case

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Here we report on the conceptual design of a 50m class millimeter and submillimeter single dish telescope, the Large Submillimeter Telescope (LST). The main observing frequency of the LST is 70 to 420 GHz, which just covers main atmospheric windows at millimeter and submillimeter wavelengths in good observing sites such as the ALMA site in Chile. We are also aiming at observations at higher frequency up to 1 THz with the limited use of the antenna surface, e.g., with the under-illumination of the surface. One of the major science goals is unveiling the large-scale structure of high- z universe in 3D and cosmic star formation history with the wide area spectroscopic surveys of dusty starbursts in [CII] and CO lines as well as continuum surveys. With exploiting synergy with ALMA and possibly TMT/SPICA, LST can contribute to the breadth of astronomy and astrophysics; e.g., astrochemistry, star formation in the Galaxy and galaxies, evolution of clusters via the SZ effect, millimeter and submillimeter VLBI, and time-domain science for transients such as GRBs.