

WISH: The Cosmic Dawn Treader

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Abstract: WISH, Wide-field Infrared Surveyor for High-redshift is the concept of the future Japanese space mission to study the 1st-generation of the galaxies over the period of cosmic reionization. WISH conducts the deep and wide-field imaging survey at 1-5 micron. The main feature is the Ultra Deep Survey observing in total of 100 deg² with multiple filters down to the limiting magnitude of 28mag (AB). By adopting the optimized timing strategy, WISH is also very powerful to detect and monitor the transient objects. The UDS is combined with the Ultra Wide Survey (covering ~1000 deg² down to 24-25 mag AB) and the Extreme Survey (covering 0.2 deg² down to ~29AB) to obtain the more complete picture of the very high-redshift universe. The primary science goals of WISH are (1) to detect and study the galaxies at $z=8-15$ (to detect 10^4-5 galaxies at $z=8-9$, 10^3-4 galaxies at $z=11-12$, and 10^1-2 galaxies at $z>15$), and (2) to detect and monitor a large number of type-Ia SNe at the rest-frame infrared wavelength to observe the cosmic expansion history with less systematic errors. WISH has the 1.5m-diameter telescope with very wide -field imager with 850 arcmin² FoV covering 0.9-5 micron. The telescope is passively cooled to 80-100K. The concept is now under the development phase (Working Group under JAXA/ISAS, since 2008) for the proposal submission to be launched in the late 2010s.