

## Title

Supernovae and Black Holes at the Epoch of Reionization

## Author

Dr. Lifan Wang

## JWST DD-ERS Notice of Intent Submission Form 18

Version 9, updated 2017-03-02 12:11 — PDF generated 2017-03-03 18:06

## Principal Investigator

Lifan Wang, lifanwang@gmail.com, Texas A&M University

## Co-Principal Investigator

Jeremy Mould, jmould@swin.edu.au, Swinburne University

## Proposal Overview

Just as a well-publicized early goal of the Hubble Space Telescope was to measure the Hubble Constant, so a well-publicized early goal of the James Webb Space Telescope is to find and characterize the first stars in the Universe. First stars, however, is shorthand for the first galaxies, the first supermassive black holes, and the first supernovae (SNe), and all that that entails. The scientific community is looking at four momentous astrophysics problems in the epoch between the Dark Ages and the transparent Universe: first supernovae, first black holes, earliest galaxies, and large scale structures in the epoch of reionization. These four themes are intricately linked, as high- $z$  SNe and massive BHs are powerful signposts of the first epoch of star and galaxy formation. This ERS will enable time-domain astronomy to redshift above 6, and set strong constraints on physics of massive star and black hole formation at redshifts around 10-20.

This ERS program will take two epochs of NIRCAM images of 50 contiguous fields around a popular deep survey fields separated in time by 3 months. Foreground exclusion is defined with rigor in this ERS. Our team will conduct a 1 micron Subaru HSC survey of these fields to complement the 2 micron and 4 micron filters of the JWST NIRCAM imaging. We will generate a catalog of high redshift objects with a preliminary variability screening that will be of great value throughout the lifetime of JWST. JWST takes us into a discovery space of transient phenomena at  $AB > 26$  mag at 4 micron of which we have no knowledge. The community needs to know what is there. This ERS can be the reference frame for all future community work on high  $z$  transients and large scale structure formation.

## Team

- D. Baade — dbaade@eso.org — European Southern Observatory — Science-Collaborators
- V. Bromm — vbromm@astro.as.utexas.edu — U. Texas — Co-Investigator
- P. Brown — pbrown@gmail.com — Texas A&M U. — Science-Collaborators
- A. Gal-Yam — avishay.gal-yam@weizmann.ac.il — Weizmann Institute — Co-Investigator
- G. Clayton — gclayton@fenway.phys.lsu.edu — Louisiana State — Science-Collaborators
- J. Cooke — jeffreycooke@swin.edu.au — Swinburne — Co-Investigator
- M. Doi — doi@ioa.s.u-tokyo.ac.jp — Tokyo Univ. — Science-Collaborators
- S. Finkelstein — slfinkel@gmail.com — U. Texas — Science-Collaborators
- P. Geil — geil.p@unimelb.edu.au — Melbourne — Science-Collaborators
- A. Heger — alexander.heger@monash.edu — Monash University — Co-Investigator
- P. Hoeflich — phoeflich77@gmail.com — Florida State — Co-Investigator
- J. Jian — yuzhoujiang@ioa.s.u-tokyo.ac.jp — Tokyo University — Science-Collaborators
- K. Krisciunas — krisciunas@physics.tamu.edu — Texas A&M U. — Science-Collaborators
- A. Koekemoer — koekemoer@stsci.edu — STScI — Science-Collaborators
- J. Maund — j.maund@sheffield.ac.uk — Sheffield — Co-Investigator
- F. Patat — fpatat@eso.org — ESO — Co-Investigator
- M. Phillips — mmp@lco.cl — Las Campanas Observatory — Science-Collaborators
- A. Rest — arminrest@gmail.com — STScI — Co-Investigator
- D. Sand — dave.j.sand@gmail.com — Texas Tech — Science-Collaborators
- B. Sparks — sparks@stsci.edu — STScI — Science-Collaborators
- J. Spyromilio — jspyromi@eso.org — ESO — Co-Investigator
- L. Staveley-Smith — lister.staveley-smith@uwa.edu.au — Univ. West Australia — Science-Collaborators
- N. B. Suntzeff — suntzeff@tamu.edu — Texas A&M University — Co-Investigator
- M. Tanaka — masaomi.tanaka@nao.ac.jp — NAOJ — Co-Investigator
- S. A. Uddin — saushuvo@gmail.com — Purple Mountain Observatory-China — Science-Collaborators
- J. Vinko — jozsef.vinko.65@gmail.com — Konkoly Observatory-Hungary — Co-Investigator
- D. Whalen — daniel.whalen@port.ac.uk — Portsmouth — Co-Investigator
- J. Wheeler — wheel@astro.as.utexas.edu — U. Texas — Co-Investigator
- M. Wood-Vasey — wmwv@pitt.edu — Pittsburgh — Co-Investigator
- Y. Yang — ngc4594@physics.tamu.edu — Texas A&M — Science-Collaborators