Swift Cycle 12
PANEL SUMMARY EVALUATION of
PROPOSAL SUBMITTED IN RESPONSE TO NRA: NNH15ZDA001N

Proposal Number: 1215103

PI Name/Institution: NEILL, JAMES/CALIFORNIA INSTITUTE OF TECHNOLOGY

Proposal Title: EARLY AND DEEP FOLLOW-UP OF SWIFT GRBS WITH P60 AND THE SED MACHINE

BRIEF SUMMARY OF RESEARCH OBJECTIVES:

The proposal aims to develop and commission a new camera for the P60 telescope, one of the most active robotic telescopes in the GRB field. The new instrument will have an IFU to provide fully automated, low-resolution optical spectroscopy of GRB afterglows. The research objectives are to obtain immediate redshift measurements of GRBs, to rapidly identify high-redshift or dust-obscured GRBs, to obtain multi-wavelength observations to allow for the identification of reverse shocks and constrain GRB energetics, and to obtain a large, unbiased sample of GRB optical afterglow light curves in order to study GRB demographics.

OVERALL ADJECTIVAL RATING:

☐ **Excellent** ☐ **Excellent/Very Good** ☐ **Very Good** ☒ **Very Good/Good**
☐ **Good** ☐ **Good/Fair** ☐ **Fair** ☐ **Fair/Poor** ☐ **Poor**

DETAILED FINDINGS:

Major Strengths:

The proposed work complements and enhances the anticipated science return from the Swift mission. P60 is among the most active and successful robotic telescopes in GRB follow-up. P60 is able to rapidly detect dim afterglows that are not detectable with smaller robotic telescopes (and lack of P60 detection may indicate extremely high redshift for a burst).

The proposal demonstrates the expertise required to complete the described analysis. The proposal indicates a proven track record of experience and a good publication record, including publishing the detection of afterglows to the GRB community via the GCN.

The proposal is on the cutting edge of GRB science with the addition of the "SED Machine". The "SED machine" currently being commissioned is very unique in its ability to provide immediate low-resolution spectroscopy for GRB afterglows (which will be able to identify the Lyman break in GRBs at redshifts between 2 and 6, thus providing an extremely

rapid redshift measurement). While automatic counterpart detection now happens routinely, automatic redshifts have never before been done. The SED machine will also provide information related to the color evolution of GRB afterglows at early times, possibly providing insight into GRB processes or the interaction of GRBs with local dust. The ability of P60 to build a data set of afterglow detections allows for population studies that include less bias toward bright bursts.

Major Weaknesses:

The proposal does not clearly establish the challenges and limitations of producing a rapid-reduction pipeline. There is no explanation of the challenges and limitations associated with building a rapid-reduction pipeline within the proposal. A description of how easy or hard it will it be to implement, as IFU analysis can be difficult, is also not provided.

The proposal does not clearly describe the specific science results expected from the SED Machine. The proposal discuses the general science topics to which the SED Machine may be able to make important contributions, but the proposal fails to describe in detail the specific science results that are expected from the SED Machine beyond rapid redshift measurements.

Minor Strengths:

The proposed research increases the scientific return of the Swift mission. It is therefore directly relevant to the research objectives of the Swift Guest Investigator Program as described in Appendix D.5 of the 2015 Research Opportunities in Space and Earth Sciences NRA.

The labor and/or procurements described in the proposal are reasonable and appropriate to accomplish the goals of the proposed investigation.

Minor Weaknesses:

The claim that P60 produces an unbiased set of afterglow observations is overstated. P60's does have the ability to detect dimmer afterglows than other rapid response robotic telescopes. However, the sample of afterglows detected by P60 still will include some observational biases, even if the bias toward bright bursts is reduced.

COMMENTS OR SUGGESTIONS FOR THE PROPOSER (Optional):

No comments noted.