Abstract Evaluation

Name of Editor: Lily Whitler

Identify the below sections in the abstract – if you identify them, copy and paste the text/summarize as instructed. In all cases, add comments if: something is missing, the text could be made clearer and/or the arguments stronger.

* Started with one or two facts that relate to the problem statement (copy them here)

“Early time light curves of supernovae can allow for constraints on the nature and geometry of progenitors and supernovae explosion energies. … This shock rapidly heats the photosphere and produces a short outburst of high-energy radiation.”

* Explained why these facts are important (copy line here)

“This is especially true for core-collapse supernovae, whose first expected signature is the result of the shock created by core collapse reaching the surface of the progenitor.”

Comments: Speaking as a non-SNe person, I don’t think I’m fully connecting the facts to the argument that we need to study CCSNe specifically. My read is that it’s important that the first signature is a result of the shock reaching the progenitor’s surface, but why and what can it tell us?

* Introduced the problem (rewrite the problem in your own words)

CCSNe are difficult to observe at early times since they’re less luminous, rise more quickly than SNe Ia, and the duration of the shock breakout is short

* Stated the goal (copy it here)

“We propose to use our state-of-the-art All-Sky Automated Survey for Supernovae (ASAS-SN) image subtraction pipeline, which has been optimized for TESS observations, to analyze 20 core-collapse supernovae with peak TESS-band magnitudes ≲18 mag, which occurred over the course of the TESS mission.”

* What is the key component? (your words)

ASAS-SN image subtraction pipeline, TESS observations (?)

* What is the target? (your words)

20 CCSNe with TESS-band magnitudes of m ≲ 18

Comment: I’m not sure whether it’s more important to focus on the pipeline or the fact that the data come from TESS. Based on the title, I’d guess TESS, but the “we propose” sentence starts with ASAS-SN. I’m sort of reading this as something like an archival proposal where both components are important, but I feel that the remainder of the abstract focuses more on the TESS data than the pipeline.

* Explained the strategy. (copy here)

“Due to the large survey area and continuous monitoring, TESS is ideal for observing the full rise and shock breakout signatures of core-collapse supernovae within the TESS field.”

Comment: I think this is excellent motivation for using TESS but I’m not really clear on the role of the image subtraction pipeline beyond using it “to analyze” the sample (presumably to construct their light curves, but is there further analysis planned?)

* Stated the importance of the solution *to the subfield*  (copy here)

“understanding the physics of core-collapse, the nature of supernovae progenitors”

* Explained the broader implications of results to *other subfields*  (copy here)

“how supernovae have shaped the elemental makeup of our universe.”

Comment: I liked the last sentence a lot.

**High-Cadence, Early-Time Observations of Core-Collapse Supernovae From the TESS Prime Mission**

Early time light curves of supernovae can allow for constraints on the nature and geometry of progenitors and supernovae explosion energies. This is especially true for core-collapse supernovae, whose first expected signature is the result of the shock created by core collapse reaching the surface of the progenitor. This shock rapidly heats the photosphere and produces a short outburst of high-energy radiation. However, core-collapse supernovae tend to have lower intrinsic luminosities and faster rise times than SNe Ia, making them difficult to observe at early times. Further, the short duration of shock breakout makes it difficult to observe for even the highest cadence ground-based surveys. We propose to use our state-of-the-art All-Sky Automated Survey for Supernovae (ASAS-SN) image subtraction pipeline, which has been optimized for TESS observations, to analyze 20 core-collapse supernovae with peak TESS-band magnitudes ≲18 mag, which occurred over the course of the TESS mission. Due to the large survey area and continuous monitoring, TESS is ideal for observing the full rise and shock breakout signatures of core-collapse supernovae within the TESS field. The light curves of these 20 core-collapse supernovae will be vital to understanding the physics of core-collapse, the nature of supernovae progenitors, and ultimately how supernovae have shaped the elemental makeup of our universe.