DIVISION D / WORKING GROUP
SUPERNOVA

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TRIENNIAL REPORT 2015-2018

1. Introduction

The Supernova WG (SN-WG) was established about two decades ago, and disbanded as part of the great IAU reorganisation prior to the 2015 GW. Members of the SN-WG continued to work together and the WG was re-established under division D in 2015. This is the first triannual report regarding its activity.

2. Developments within the past triennium

Goals: The SN-WG was set up with three specific goals, stated in the proposal approved in the 2015 GA:

• **Goal 1.** With the large number of new SNe detected each year, the way SNe are catalogued and designated needs to be revised, so that large numbers of events could be assigned standard, community-wide SN names and rapidly reported to interested members. We set a goal for the working group to propose and implement a new, automated machinery to deal with astronomical transients (and SNe in particular) which will replace the then current manual name assignment system while maintaining the same high standards of fidelity.

• **Goal 2.** With many new SN classes identified in recent years, we intend to initiate a discussion about SN classification, and investigate whether a new classification scheme (based on the current one, or differing from it) should be adopted. A minimal goal is to standardize the way certain SN subclasses are referred to in the literature.

• **Goal 3.** With the explosion of digital data, we will work to further encourage and develop SN databases that will help preserve, share and improve SN data, starting with existing databases and working to generalize and improve these.

Progress: During the 2015-2018 triennium, the WG achieved significant progress regarding each of those goals, as we briefly detail below.

• **Goal 1.** The WG has developed, established and achieved approval for a new automated IAU instrument to name and curate transients and supernovae, the transient name server (TNS†). The new automated instrument has been widely adopted by both the professional and amateur communities. In the last two years over 6000 transients per year were reported to the TNS (a total of > 15000 since January 1, 2016, of which > 700 per year are spectroscopically-confirmed supernovae. These events are reported in

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† https://wis-tns.weizmann.ac.il/search

real time to the community, 24/7, with less than 1s delay. The system has been working smoothly without significant down time since its launch in January 2016. We therefore consider the basic definition of Goal 1 to have been achieved.

• **Goal 2.** During the last three years, numerous members of the supernova community have jointly authored the "Handbook of Supernovae" a broad reference work printed by Springer†. This reference work also contains a comprehensive chapter reviewing the subject of supernova classification into the various types and classes (Gal-Yam 2016). The hope is that usage of this reference will eventually lead to standardisation of supernova class names. This work, as well as some recent other works, propose altogether alternate ways to classify SNe, and it remains to be seen whether the community can converge on a modified version of the existing method, or would consider replacing it altogether. We therefore regard the work toward this goal as initiated, although additional work to which the WG can contribute is certainly needed.

• **Goal 3.** During the last three years the holdings of SN data in digital archives have increased in size and quality, in particular via WISeREP‡ (Yaron & Gal-Yam 2012, containing almost 20000 public spectra, and the Open Supernova Catalog (OSC¶; Guillochon et al. 2017). Automated upload of spectra from the TNS to WISeREP, as well as the regular release of public spectra from large community projects like ESO/PESSTO and ePESSTO via WISeREP continue to increase the size of these community resources. The SN-WG will continue to develop these resources.

3. Future prospects

With significant progress achieved during the last 3-year period, we look forward to continuing and developing the WG activity along the following lines. First, we will work with the WG as well as other relevant communities in order to see whether the TNS infrastructure can be smoothly merged with other relevant instruments, for example the GCN network - a preliminary interface for gravitational wave localizations has already been implemented. The TNS will be used to distribute alerts from the large ZTF survey that is under commissioning, and is set up to ingest and distribute the alert stream from LSST.

The work on SN classification schemes continues. Changes and updates will require a broad consensus among the community, and the WG will try to foster meetings and processes that will enable and support this discussion.

Usage of digital archives will continue to grow, and the working group will continue to encourage this activity.

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Avishay Gal-Yam
chair of Working Group

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References

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† http://www.springer.com/la/book/9783319218458
‡ https://wiserep.weizmann.ac.il/
¶ https://sne.space/