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Type Ia supernova spectrophotometric standardisation and application to the ZTF spectra sample

mercredi 30 octobre 2024 12:00 (20 minutes)

Type Ia Supernovae (SNe Ia) are reliable standard candles for measuring cosmic distances due to their nearly constant maximum luminosity. Standardisation methods have been developed to reduce intrinsic scatter and improve distance estimates. Traditional photometric method reaches a 8% precision in distance, but the SNFactory (SNf) [1] survey has suggested that a spectroscopic approach can reach 4%.

In this study, we attend to validate this spectroscopic method called the Twins Embedding [2] [3] (TE) using an other survey. The Zwicky Transient Facility (ZTF) spectra sample [4] has around 700 spectroscopic SNe, four times larger than SNf for the same selection cuts, but with lower Signal-to-Noise ratio. We will also study the robustness of TE under different observational conditions and data qualities.

During the talk, I will present the Twins Embedding method, his performance dependancy on different data sample qualities, and the first results of ZTF spectral standardisation.

References

[1] G. Aldering et al., "Overview of the nearby supernova factory,"vol. 4836, Dec. 2002. doi: https://doi.org/10.1117/12.458107.
[2] K. Boone et al., "The twins embedding of type Ia supernovae I: The diversity of spectra at maximum light,"
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[3] K. Boone et al., "The twins embedding of type Ia supernovae II: Improving cosmological distance estimates,"The
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[4] M. Rigault et al., "ZTF SN Ia DR2: Overview,"Sep. 2024. doi: 10.48550/arXiv.2409.04346. doi : https://doi.org/10.48550/arXiv.2409.04346

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