Bastien Carreres

Publications list

Publications

Publications as first author

1. **Carreres**, Rosselli, et al. 2024. *ZTF SN Ia DR2: Peculiar Velocities' Impact on the Hubble Diagram*
   In: Astronomy & Astrophysics. DOI: 10.1051/0004-6361/202450389
   This paper is part of the second data release of ZTF SNe Ia. In this paper, we study the impact of the peculiar velocity (PV) systematics on the SNe Ia Hubble diagram of the ZTF SNe Ia DR2 data. We show that not taking into account the full PV covariance matrix can lead to a slight underestimation of the error on the Hubble constant H_0 and could shift its value by ~ 1 km.s^{-1}.

2. **Carreres**, Bautista, et al. 2023. *Growth-Rate Measurement with Type-Ia Supernovae Using ZTF Survey Simulations*
   In: Astronomy & Astrophysics. DOI: 10.1051/0004-6361/202346173
   This paper is the main publication of my thesis. In this paper, I present my work to prepare the future analysis of $f\sigma_8$ with the maximum likelihood method from SNe Ia data only. I describe my realistic simulation of the ZTF SNe Ia data and, using these simulations I study the bias and systematics that can affect the measurement of $f\sigma_8$. I show that using SNe Ia data from the full 6 years of the ZTF II with a cut at a redshift of $z < 0.06$ to avoid selection due to magnitude limit, we can expect an unbiased measurement of $f\sigma_8$ with an error of $\sim 19\%$.

Publications with significant contribution

1. Peterson, **Carreres**, et al. 2025. *Improving the Determination of Supernova Cosmological Redshifts by Using Galaxy Groups*
   In: The Astrophysical Journal. DOI: 10.3847/1538-4357/ada285
   In this paper we used SNe Ia data and the Uchuu UniverseMachine simulation to study the improvement on the SNe Ia Hubble diagram that we can expect from averaging redshift over galaxy groups of SN Ia hosts. I actively contributed to this paper and ran the simulations that were used for the analysis.

2. Ravoux, **Carreres**, et al. 2025. *Generalized Framework for Likelihood-Based Field-Level Inference of Growth Rate from Velocity and Density Fields*
   In: arXiv e-prints. DOI: 10.48550/arXiv.2501.16852
   This paper presents the FLIP python library. This library is based on codes developed during my PhD and propose a more general framework for constrain of the growth-rate of structures. I actively participated to the developpement of FLIP and to the writting of this paper.

Publications as co-author

1. Amenouche, Smith, et al. 2024. *ZTF SN Ia DR2: Simulations and volume limited sample*
   In: arXiv e-prints. DOI: 10.48550/arXiv.2409.04650

2. Aubert, Rosnet, et al. 2024. *ZTF SN Ia DR2: Exploring SN Ia properties in the vicinity of under-dense environments*
   In: arXiv e-prints. DOI: 10.48550/arXiv.2406.11680

3. Ginolin, Rigault, et al. 2024. *ZTF SN Ia DR2: Colour standardisation of Type Ia Supernovae and its dependence on environment*
   In: arXiv e-prints. DOI: 10.48550/arXiv.2406.02072

4. Ginolin, Rigault, et al. 2024. *ZTF SN Ia DR2: Environmental dependencies of stretch and luminosity of a volume limited sample of 1,000 Type Ia Supernovae*

In: arXiv e-prints. DOI: 10.48550/arXiv.2405.20965

5. Popovic, Rigault, et al. 2024. *ZTF SN Ia DR2: Evidence of Changing Dust Distributions With Redshift Using Type Ia Supernovae*
In: arXiv e-prints. DOI: 10.48550/arXiv.2406.06215

6. Rigault, Smith, et al. 2024. *ZTF SN Ia DR2: Study of Type Ia Supernova lightcurve fits*
In: arXiv e-prints. DOI: 10.48550/arXiv.2406.02073

7. Rigault, Smith, et al. 2024. *ZTF SN Ia DR2: Overview*
In: arXiv e-prints. DOI: 10.48550/arXiv.2409.04346

8. Ruppin, Rigault, et al. 2024. *ZTF SN Ia DR2: Impact of the galaxy cluster environment on the stretch distribution of Type Ia supernovae*
In: arXiv e-prints. DOI: 10.48550/arXiv.2406.01108

9. Scolnic, Riess, et al. 2024. *The Hubble Tension in our own Backyard: DESI and the Nearness of the Coma Cluster*
In: arXiv e-prints. DOI: 10.48550/arXiv.2409.14546

Talks

- Feb. 2025 - **SNe Ia growth-rate measurements with Rubin-LSST simulations: intrinsic scatter systematics** [link]

- Feb. 2025 - **Improving SN Ia Hubble residual scatter with galaxy groups** [link]

- Oct. 2024 - **DESC Project announcement: Measurement of the growth-rate of structures using SN Ia PVs in the BBC framework** [link] at *DESC-TD beweekly meeting*, online

- Sept. 2023 - **Possible velocity systematic on the Hubble diagram fit** [link] at *ZTF France*, LPC, Clermont-Ferrand, France

- Aug. 2023 - $f\sigma_8$ **measurement with type Ia supernovae** [link] at *DESC-TD beweekly meeting*, online

- May 2023 - **Growth-rate measurement with type Ia supernovae** [link] at the *Duke cosmology group' seminar*

- Nov. 2022 - **Cosmology with the growth rate using type Ia supernovae** [link] at *Action Dark Energy 2022*, Marseille, France

- May 2022 - **Measuring** $f\sigma_8$ **with the ZTF SN Ia sample** [link] at *Rubin-LSST France 2022*, LAPP, Annecy, France

- May 2022 - **Measuring** $f\sigma_8$ **with the ZTF SN Ia sample** [link] at *ZTF spring meeting*, LPNHE, Paris, France

- June 2021 - **Peculiar velocities with Type Ia Supernovae** [link] at *Rubin-LSST France 2021*, LPSC, Grenoble, France

Posters

- 2022 - **Cosmology with the growth rate of structures using type Ia supernovae** [link] at *DESC Summer Meeting 2022*, University of Chicago

- 2022 - **Cosmology with the growth rate of structures using type Ia supernovae** [link] + Proceedings

[link] at *Rencontres de Moriond*