Bastien Carreres

Publication list

Publications

Publications as first author

1. **Carreres**, Chen et al. 2025. *Type Ia supernova growth-rate measurement with LSST simulations : intrinsic scatter systematics*
In ArXiV. DOI : `10.48550/arXiv.2505.13290`
In this paper, I study the impact of intrinsic scatter of SNe Ia on the measurement of $f\sigma_8$. This study is done through the simulation of the full low-z LSST SNe Ia sample for different intrinsic scatter models. For the most realistic model of intrinsic scatter causes non-Gaussianities in the Hubble diagram residuals result in a bias on $f\sigma_8$.

2. **Carreres**, Rosselli et al. 2025. *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}.

3. **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. Ravoux, **Carreres** et al. 2025. *Generalized framework for likelihood-based field-level inference of growth rate from velocity and density fields*
In Astronomy & Astrophysics. DOI : `10.1051/0004-6361/202554319`
This paper presents the FLIP python library. This library is based on codes developped 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.

2. 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.

Publications as co-author

1. Ginolin, Rigault et al. 2025. *ZTF SN Ia DR2 : Environmental dependencies of stretch and luminosity for a volume-limited sample of 1000 type Ia supernovae*
   In Astronomy & Astrophysics. DOI : 10.1051/0004-6361/202450378

2. Amenouche, Rosnet et al. 2025. *ZTF SN Ia DR2 : Simulations and volume-limited sample*
   In Astronomy & Astrophysics. DOI : 10.1051/0004-6361/202452134

3. Rigault, Smith et al. 2025. *ZTF SN Ia DR2 : Study of Type Ia supernova light-curve fits*
   In Astronomy & Astrophysics. DOI : 10.1051/0004-6361/202450377

4. Aubert, Rosnet et al. 2025. *ZTF SN Ia DR2 : Exploring SN Ia properties in the vicinity of under-dense environments*
   In Astronomy & Astrophysics. DOI : 10.1051/0004-6361/202450951

5. Popovic, Rigault et al. 2025. *ZTF SN Ia DR2 : Evidence of changing dust distribution with redshift using type Ia supernovae*
   In Astronomy & Astrophysics. DOI : 10.1051/0004-6361/202450391

6. Ruppin, Rigault et al. 2025. *ZTF SN Ia DR2 : Impact of the galaxy cluster environment on the stretch distribution of Type Ia supernovae*
   In Astronomy & Astrophysics. DOI : 10.1051/0004-6361/202450956

7. Scolnic, Riess et al. 2025. *The Hubble Tension in Our Own Backyard : DESI and the Nearness of the Coma Cluster*
   In The Astrophysical Journal Letters. DOI : 10.3847/2041-8213/ada0bd

Talks

1. Feb. 2025 - **SNe Ia growth-rate measurements with Rubin-LSST simulations : intrinsic scatter systematics** at *CosmicFlows 2025*, Brisbane, Australia

2. Feb. 2025 - **Improving SN Ia Hubble residual scatter with galaxy groups** at *CosmicFlows 2025*, Brisbane, Australia

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

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

5. Aug. 2023 - **$f\sigma_8$ measurement with type Ia supernovae** at *DESC-TD biweekly meeting*, online

6. May 2023 - **Growth-rate measurement with type Ia supernovae** at the *Duke cosmology group' seminar*

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

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

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

10. June 2021 - **Peculiar velocities with Type Ia Supernovae** at *Rubin-LSST France 2021*, LPSC, Grenoble, France

Posters

1. 2022 - **Cosmology with the growth rate of structures using type Ia supernovae** at *DESC Summer Meeting 2022*, University of Chicago

2. 2022 - **Cosmology with the growth rate of structures using type Ia supernovae + Proceedings** at *Rencontres de Moriond*