

Peculiar velocities with SN Ia

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The growth rate of structures of our Universe depends on expansion history and gravity. It can be used to test the cosmological standard model (LCDM) and as a probe of modified-gravity models.

The evolution of the density and the velocity field of galaxies can be characterised by the $f\sigma_8$ parameter. Recent papers (Howlett et al 2017, Graziani et al 2020) suggest that we can use Type Ia Supernovae (SN Ia) as tracer of peculiar velocities of host galaxies. Indeed, peculiar velocities have an effect on the observed flux of SN Ia and this effect has measurable repercussions on the SN Hubble Diagram residuals.

During the talk, I will present our current work on SN Ia simulations on LSST and ZTF surveys :

We use realistic simulated SN Ia lightcurves to estimate our abilities to retrieve peculiar velocities from Hubble diagram, then compute the velocity power spectrum and put constraints on $f\sigma_8$.

We also plan to study the impact of several systematics errors on the growth-rate estimates.

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