



Contribution ID: 328

Type: **Oral**

Cosmological Tests with Type Ia Supernovae

Thursday 10 August 2017 14:45 (15 minutes)

Type Ia supernovae (SNe Ia) provided the first direct evidence for the accelerated expansion of the universe, leading to the now-standard Lambda-CDM model featuring dark energy. Beyond direct dark energy measurements, these accurate standard candles can be employed in a variety of ways to test the Lambda-CDM model. I will show how an analysis of the peculiar velocities of SNe Ia constitutes a powerful test of the cosmological model at the lowest redshifts. I will also illustrate that, while SNe Ia fundamentally measure distance, careful treatment can yield unbiased measurements of the relative expansion rate, facilitating fast subsequent cosmological inference and complementarity with similar measurements from other probes of geometry. I will present the highest-redshift SN Ia measurement of expansion from SNe observed via the HST CANDELS & CLASH programs.

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Session Classification: Cosmology

Track Classification: Cosmology (incl. neutrino mass/number density)