



Contribution ID : 67

Type : **Contributed talk**

Unlocking the evolution of star formation with CASTOR

Wednesday, 28 October 2026 12:55 (10)

Ultraviolet observations provide a direct view of young stellar populations associated with recent star formation in galaxies, complementing longer-wavelength observations that trace older stellar populations. The Canadian-led Cosmological Advanced Survey Telescope for Optical and ultraviolet Research (CASTOR) will provide wide-field coverage with deep imaging fields, enabling large samples of low-mass galaxies to be studied through recent star formation. We investigate how addition of CASTOR observations affects recovery of galaxy star formation rates (SFRs) from photometric spectral energy distribution (SED) fitting. We construct forward-modelled galaxy spectra using Binary Population and Spectral Synthesis models and galaxy populations drawn from Santa Cruz semi-analytic model lightcones at $0 < z < 5$. Mock CASTOR, Euclid, and SDSS observations are generated to provide panchromatic coverage from the ultraviolet to the near-infrared, and SFR recovery is assessed using SED fitting with and without CASTOR observations. We find an improvement in SFR recovery accuracy from 0.54 to 0.28 dex at $z < 1$ when incorporating CASTOR observations, while over $0 < z < 5$ the difference decreases from 0.34 to 0.28 dex. CASTOR also increases the number of galaxies meeting our SED-fitting detection criteria by 61 percent, with approximately three-quarters of the additional galaxies undetected in Euclid and SDSS bands. These additional galaxies are predominantly among the lower-mass and lower-SFR systems in the sample. Our results demonstrate that deep ultraviolet observations provide important complementary constraints on photometric SFR estimates, particularly at low redshift, while also enabling large samples of faint, low-mass galaxies to be studied alongside longer-wavelength observations.

Did you give a contributed talk at CASCA 2026?

No

If you are selected for a poster, would you be interested in giving a short flash talk on your work?

Yes

What is your career level?

Postdoctoral

Which keyword describes the area of focus of this talk?

Galaxies

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Session Classification : Galaxies, Gas/dust, Solar system & Stars