



Contribution ID : 74

Type : **Poster**

Bayesian and Brisk: Scalable AGN Lightcurve Simulation and Fitting for Supernova Cosmology and Population Studies

Wednesday, 28 October 2026 14:22 (1)

Active Galactic Nuclei (AGNs) are dense, bright regions at the centre of galaxies thought to be caused by matter accreting into a supermassive black hole. Millions of AGNs have been observed, and population-level studies are needed to learn about AGN physics.

On the other hand, AGNs can be contaminants in cosmology. Type 1a supernovae are frequently used as “standard candles” to infer cosmological parameters by estimating both their redshift and distance modulus to trace cosmic expansion. The Legacy Survey of Space and Time (LSST) will observe millions of supernovae photometrically. Since few Type 1as will be spectroscopically confirmed, other transients can be confused for Type 1as due to low cadence and different sources of uncertainty, such as instrument noise and model uncertainty. All sources of uncertainty, including the uncertainty in the label of the source, must be propagated throughout the model in a fully Bayesian manner to acquire credible intervals for the inferred cosmological parameters. This is what the package *Cosmographi* aims to do, while remaining scalable by using JAX.

This work will present the forward model and fitting modules for AGNs within the *Cosmographi* framework. The user will be able to produce simulated lightcurves orders of magnitude faster compared to pre-existing methods. Moreover, it allows for fully Bayesian lightcurve fitting, and inference of cosmological parameters from a population with different types of transients.

In conclusion, we present advances towards a fully Bayesian estimation of cosmological parameters from millions of supernovae, and population-level studies of AGNs.

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?

Undergraduate

Which keyword describes the area of focus of this talk?

Astrostatistics

Primary author(s) : Ms AUGSPACH, Zoe (University of Toronto)

Co-author(s) : Dr STONE, Connor (University of Toronto); Prof. HLOŽEK, Renée (Dunlap Institute for Astronomy and Astrophysics, Université Laval)

Presenter(s) : Ms AUGSPACH, Zoe (University of Toronto)

Session Classification : Galaxies