

## Lumière (Latest Upgraded Methodologies for the Investigation of X-Ray Emitting sources)

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### Simulation-based inference for X-ray spectral fitting

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In this paper, I will introduce simulation-based inference for X-ray spectral fitting, emphasizing on its application to the challenging newAthena mock X-IFU high-resolution X-ray spectra. Training a neural density estimator on dimension reduced spectra, computed either through a compact and light encoder or an embedding network enables to quickly derive posterior approximates. I will then describe how the approximate posterior estimates can be corrected by the known likelihood, via importance-resampling, to generate an asymptotically exact estimate of the posteriors, identical to the ones produced by BXA, yet within a run time at least an order of magnitude shorter.

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