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Towards a new generation of reflection models for precision measurements of accreting black holes

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Blurred reflection features are commonly observed in the X-ray spectra of accreting black holes. In the presence of high-quality data and with the correct astrophysical model, X-ray reflection spectroscopy can be a powerful tool to probe the strong gravity region of black holes, study the morphology of the accreting matter, measure black hole spins, and even test Einstein's theory of General Relativity in the strong field regime. In the past 10-15 years, there has been significant progress in the development of the analysis of these reflection features, thanks to both more sophisticated theoretical models and new observational data. However, the next generation of X-ray missions (e.g. eXTP, Athena, HEX-P) promises to provide unprecedented high-quality data, which will necessarily require more accurate synthetic reflection spectra than those available today. In this talk, I will review the state-of-the-art in reflection modeling and I will present current efforts to develop a new generation of reflection models based on neural networks.

Primary author: BAMBI, Cosimo (Fudan University)

Presenter: BAMBI, Cosimo (Fudan University)

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