

## **Modeling astrophysical plasmas - databases, codes, and uncertainties**

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A major fraction of the known visible matter in the Universe is in the form of hot gas of temperatures between  $10^4$  to  $10^8$  Kelvin. The present and future generation of X-ray satellites offer an essential tool to diagnose the cosmic hot plasmas. As more high resolution X-ray spectra are becoming available, the astrophysical community urgently needs accurate theoretical models to interpret the data. This includes not only a plasma code, but also a substantial database of rates and wavelengths that could only be completed using theoretical calculations, supplemented by a small sets of key rates and wavelengths from laboratory results. This talk will present the state of the art plasma codes and atomic database, together with further improvements that will be needed to fully exploit the future space missions, including the ESA flagship mission Athena and its precursor XRISM from JAXA and NASA. I will also discuss how the present systematic uncertainties in atomic constants can affect the accuracies of scientific results obtained from the X-ray spectra.