MACHINE LEARNING
FOR ASTROPHYSICS
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Dust extinction inference from Random Forest regression of insterstellar spectral line widths

Dust extinction is ubiquitous in the Universe and a challenge in the correction of the brightness and color in astronomical observations. Spectral absorption lines from abundant gas atoms in the interstellar medium (ISM) like sodium, potassium and calcium, or molecules like diffuse interstellar bands, among others, serve as dust indicators and have been used to estimate dust extinction. However, several caveats and limitations exist like line saturation at high optical depths.

We explore here new automated avenues to infer dust extinction from spectral lines with a large sample of supernova spectra. We first develop an automated techinque to measure equivalent widths with high accuracy when compared to high-resolution spectra and simulated spectra. Secondly, with the Milky Way extinction values of Schlafly & Finkbeiner (2011), we train machine learning techniques like random forest regression that use all available lines as input features finding much better predictions of dust extinction than traditional methods based on trends from measurements of single species.

Main Topic

Classification and regression

Secondary Topic

Supervised/Unsupervised/Semi-supervised Learning

Participation mode

In person

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Session Classification: Supervised Learning