



# MACHINE LEARNING FOR ASTROPHYSICS

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## Probing AGN dynamics through a natural language processor lens

*Thursday, 11 July 2024 12:05 (5 minutes)*

We employ natural language processing algorithms with attention, repurposed to receive QSO spectra to predict unseen spectra, broad lines, and super massive black hole masses. We find that the trained algorithm is able to reproduce with high significance masked broad lines and/or continua in QSO spectra, highlighting an ability to learn from and leverage physical information imprinted amongst the entire spectrum. A key implication is that this information may help to refine physical properties such as single-epoch black hole masses. We tested the algorithm's ability to directly predict black hole masses, with no spectral fitting or decomposition, finding reasonable success to reproduce single-epoch prescriptions. Finally, the algorithm is able to reconstruct broad UV lines such as C IV and Ly-alpha in the presence of broad absorption lines or intervening IGM. We will discuss the attention mechanism, which allows us to peek inside and probe what information is being used to make the above predictions and several broad future applications that we envision.

**Main Topic**

**Secondary Topic**

**Participation mode**

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**Session Classification:** FlashTalks: Other