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Title: Mining of Kepler Data through Machine Learning
Type: Poster
Session: Stellar Activity, Rotation, Ages, Metallicity
Abstract: Kepler's high cadence and incredible precision has provided an unprecedented view into stars and their planetary companions, revealing both expected and novel phenomena and systems. Due to the large number of Kepler lightcurves, the discovery of novel phenomena in particular has often been serendipitous in the course of searching for known forms of variability (for example, the discovery of the doubly pulsating elliptical binary KOI-54, originally identified by the transiting planet search pipeline). In this talk, we discuss progress on mining the Kepler data through machine learning, intended to both
systematically search the Kepler lightcurves for rare or anomalous variability, and to create a variability catalog for community use. We have been exploring both supervised learning, wherein objects are labeled as being various known types of variable stars, as well as unsupervised learning, wherein the data are allowed to cluster naturally according to metrics characterizing their variability. Mining the dataset in this way also allows for a quantitative identification of anomalous variability, and so may also be used as a signal-agnostic form of optical SETI. As the Kepler data are exceptionally rich, they provide an interesting counterpoint to machine learning efforts typically performed on sparser and/or noisier survey data, and will inform similar characterization carried out on future survey datasets.