Abstract Submitted
for the NMC16 Meeting of
The American Physical Society

Determination of M and K dwarf Effective Temperature, Radius, Mass and Metallicity Using a Data-driven Spectral Model by the Cannon BRIANNA GALGANO, KEIVAN STASSUN, Vanderbilt University, BARBARA ROJAS-AYALA, Universidad Andrs Bello, SAURAV DHITAL, None — M and K dwarfs can host complex molecules (CaH, TiO) in their outer layers that can be used to estimate stellar metallicity, a likely indicator of exoplanets in a stellar system. However, these chemical abundances make their spectra particularly complicated to analyze with their overlapping spectral lines and and lack of a well defined continuum. Synthetic spectral modeling is able to extrapolate characteristics of low dwarfs stars from their spectra. Yet, utilizing synthetic models is limited by the physics knowledge of spectroscopy and is not an efficient method computationally when handling large-scale astronomical surveys. The Cannon is a solution to these difficulties. It is a machine learning program that trains itself to read defined stellar spectra so that it can infer stellar characteristics from unprocessed spectra. We have successfully prepared a set of 183 M and K dwarf stars so that the Cannon would be able to infer the four basic properties (T_{eff}, radius, mass, and [Fe/H]) of uncharacterized spectra from low-mass dwarfs. We have found that the Cannon performs the best at when given the largest possible range of wavelengths (0.4 to 2.4 microns for our spectra) and with an automated continuum normalization process conducted with IDL packaging.

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Date submitted: 23 Sep 2016 Electronic form version 1.4