Will Flanagan
Absorption Line Profiles for Rapid, Differentially Rotating Stellar Models

My project involves the morphology of line profiles in differentially rotating $2M_\odot$ models. The models are taken from the Self-Consistent-Field Method of Jackson, MacGregor, Skumanich, 2004. I am working with a code that constructs the Mg II λ4481 absorption line in the aforementioned models. The line profile code has been optimized using inherent symmetries and a new algorithm for the Voigt function (Humlicek 1982). The program has also been modified to account for line and continuum opacity dependence on latitude, due to gravitational darkening. Using this modified code for generating profiles, I have made use of Prinipal Component Analysis (PCA) to analyze the input parameters of our code. The parameters I am analyzing are most notably those of inclination and rotation, as well as others such as microturbulence. This analysis hopes to quantify the effect of differential rotation on absorption line profile shapes.