REMOVING A SOURCE OF PLANETARY DETECTION BIAS: STELLAR GRANULATION MODELS FOR KEPLER

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The primary noise sources for the Kepler mission include photon noise, CCD and other instrumental noise, and "noise" intrinsic to the targets themselves: stellar activity, oscillations, and granulation. Presently, the granulation contribution is estimated based on the solar case, which means that it typically accounts for 10% of the noise contribution at frequencies of interest for planet detection. However, for high metallicity stars, recent models suggest that granulation noise could be an order of magnitude higher than the solar case would lead one to expect. Not only will this lead to fewer planet detections, it also constitutes a selection bias which will hinder the statistical description of the frequency of planets around different types of host stars. The proposed effort involves using Kepler data to construct an improved granulation model as a function of fundamental stellar parameters, including mass, effective temperature, activity level, and metallicity. This model can then be used to minimize the granulation signature in the time series.