

**Improved Methods for Ground-Based Follow-Up of Young Stars and Planets from the
ZEIT Survey**
Stephen Schmidt

NASA's *Kepler/K2* and *TESS* missions have detected thousands of exoplanets. In order for detections to be made at such a large scale, comparatively little time can be dedicated to any one target. Due to these telescope time constraints, exoplanet candidates often cannot be followed up on by the same instrument that discovered them. So, ground-based telescopes must be utilized to verify the properties of and signals from these objects through the detection of additional transit events. The ground-based data are subject to errors from the atmosphere, which significantly impacts the ability to detect such events. Nevertheless, the extra observations from ground-based telescopes are indispensable for confirming space-based detections, and for providing a basis for future more detailed investigations. In this work, we tackle the problem of atmospheric interference with an atmosphere-correcting photometry pipeline. We use data from Las Cumbres Observatory to construct light curves of a variety of targets, including exoplanets, eclipsing binaries, and stars with discs that periodically decrease in magnitude ('dippers'). Using nearby stars observed simultaneously with the target, we fit for multiple atmospheric terms, enabling the extraction of changes in stellar flux of $< 0.1\%$, and facilitating the confirmation of signals detected from space-based facilities.