Abstract Submitted
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Distance Determination to Binary Stars through Radiative Transfer Modeling[1] RICHARD PEARSON, ROBERT STENCEL, University of Denver — The epsilon Aurigae binary star system includes a F0 primary (7500 K) and an opaque accretion disk that engulfs the secondary star. The reported distance of the system falls around 800 +/- 200 pc. Uncertainty in the system's distance results in an observational parameter space that can be fitted by multiple evolutionary tracks. We explore a novel constraint to break this degeneracy. The accretion disk has an azimuthal temperature gradient, in response to the orbital phase of the primary star, plus disk rotation. Analysis of the thermal gradient with assumptions about the material properties of the disk, can constrain the distance. We use Monte Carlo radiative transfer methods to model the system. New constraints on physical parameters (binary separation, disk mass, disk composition, evolutionary state) are sought. Numerical models are created in HYPERION (Robitaille, http://arxiv.org/abs/1112.1071) by first defining a specific distance which parametrizes the model's inputs. The resulting disk temperatures are compared against the observed temperature range. Using a range of distances, we can match the disk temperature constraint with a smaller distance, and hence lower masses. The next step is to explore system response to a wider diversity of dust types.

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