Bulletin of the AAS • Vol. 56, Issue 2 (AAS243 Abstracts)

Stars and Circumstellar Disks in Close Young Binary Systems

Peter Knowlton[1] Lisa Prato[1] Taylor Kutra[1] Jacob Hyden[1]
Shih-Yun Tang[2] Gail Schaefer[3] Christopher Johns-Krull[2]

[1]Lowell Observatory, [2]Rice University, [3]CHARA Array - Georgia State University

Published on: Feb 07, 2024

URL: https://baas.aas.org/pub/2024n2i176p07

Most stars are located in binary/multiple systems, therefore a complete picture of planet formation requires incorporating the impact of binary systems. Although fewer planets form around stars in multiple systems, astronomers have discovered hundreds of circumstellar exoplanets in binaries. Theoretical and observational evidence suggests that close binaries, with separations <50 AU, have smaller and shorter-lived disks than their single-star or wide binary counterparts. We aim to correlate well-determined stellar properties with circumstellar disk characteristics in order to understand their influence on the formation of planets. Using the Keck II and VLT telescopes, we have collected high-resolution (R=30,000), near-infrared spectra of the individual components in 100 young binary systems with separations from ~10 to several hundred AU. Our analyses focus on absorption lines highly sensitive to stellar and disk parameters such as effective temperature, veiling, surface gravity, surface-averaged magnetic field strength, and projected rotational velocity, extracted by fitting the observed spectra to synthetic models. Statistical tests will reveal how stellar properties impact circumstellar material and either permit or impede the formation of planets. Uniformly-derived disk and stellar parameters and the observed spectra will be made publicly available on the Young Binary Star Database.