Mottled Stars

How Does Starspot Surface Coverage Affect Stellar Brightness Variability?

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Abstract

Starspots have been observed by the Western scientific community since Galileo Galilei and Thomas Harriot first used telescopes to observe sunspots on the Sun almost four centuries ago. In general, starspots are dark blotches on the surface of a star, and they appear and disappear over time. Their formation and their affects on a host star are poorly understood. Starspots can mask the identity of distant stars by either making superficial changes to a star’s observable properties or cause deep structural changes. In this project, we will be investigating how surface coverage starspots affect a star’s brightness over time by creating three-dimensional models of spotted stars and calculate their surface brightness over a period of time. This will allow us to make theoretical predictions that will let us how starspots influence the properties their host star. These results will be compared to data collected on brightness variability amplitudes. This project will aid us in tackling two current problems in stellar astrophysics: are starspots causing real stars to appear larger than predicted, and where and how starspots form within stars.