



# The fingerprint of a star: $\alpha$ Ari

$\alpha$  Arietis (13 Ari = HD 12929), also known as Hamal, is about 65.8 light-years from the Sun. It is a giant star that may host an orbiting planet with a mass greater than Jupiter. The spectrum of this star matches a stellar classification of K2 III Ca-1, with the luminosity class of III indicating that it has exhausted the supply of hydrogen at its core and is now on the red giant branch. The "Ca-1" portion of the classification indicates that it shows weaker than normal lines of calcium in its spectrum. The spectrum of this star has served as one of the stable anchor points by which other stars are classified. It is estimated to have about 50% more mass than the Sun, while interferometric measurements show it to be 15 times larger in diameter and radiating about 90 times the Sun's luminosity

from its outer envelope at an effective temperature of  $\approx 4,500$  K. This poster shows the optical spectrum of  $\alpha$  Ari obtained with the Potsdam Echelle Polarimetric and Spectroscopic Instrument (PEPSI) of the Large Binocular Telescope (LBT). It plots the normalized intensity as a function of wavelength  $\lambda$  in Angströms ( $1\text{\AA}=0.1\text{nm}$ ) from the top left corner to the bottom right corner. The PEPSI spectrum covers the wavelengths between 3820 Å (top left) and 9130 Å (bottom right) with an average spectral resolution of  $R=\lambda/\Delta\lambda\approx 220,000$  or approximately 1.4 km/s. Its average dispersion is 0.012 Å/pixel. Integration time with the LBT was 10 sec and consists of 3-8 exposures in all six cross dispersers. The signal-to-noise ratio (S/N) of the spectrum peaks at 1630:1 at 5840 Å and has a low of

530:1 near 4500 Å. The exposure was obtained on November 20 and 27, 2015. A subset of spectral absorption lines is identified in the graphics and marked with dashes beneath the spectrum. The annotation indicates the chemical element (e.g., Fe for iron), the ionization state (I for a neutral line, II for an ionized line), and the wavelength in Angström. The original spectrum has been published in *Astronomy & Astrophysics* (Strassmeier, K. G., Ilyin, I., & Weber, M. 2018, A&A, **612**, A45; see <https://pepsi.aip.de/>).

