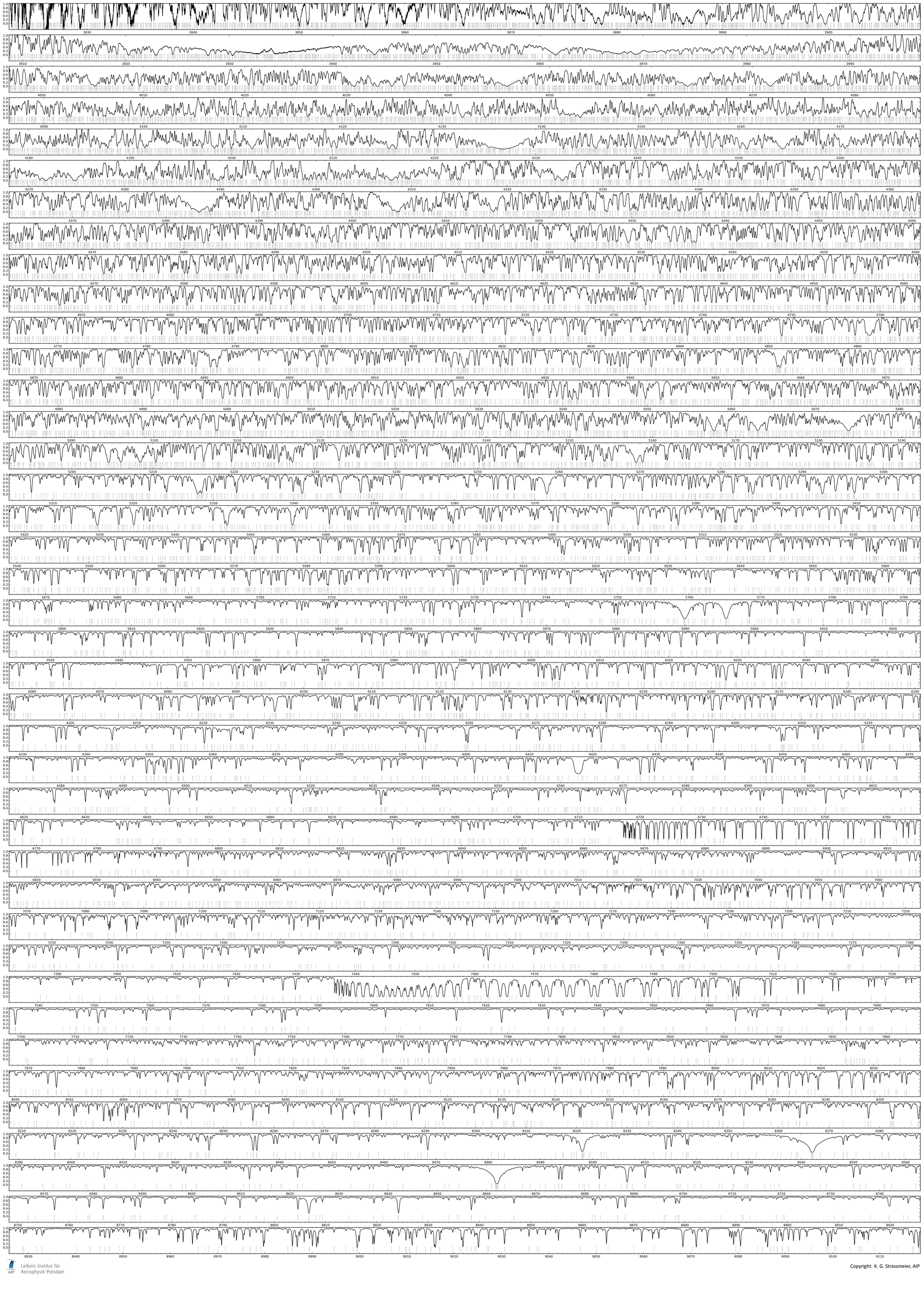
The fingerprint of a star: β UMi

β Ursae Minoris (7 UMi = HD 131783), also named Kochab, is a red K4 class III giant at a distance of 131 light years. It is 130 times more luminous than the Sun. Kochab has reached a state in its evolution where the outer envelope has expanded to 42 times the size of the Sun. This enlarged atmosphere is radiating 390 times as much luminosity as the Sun from its outer atmosphere at an effective temperature of 4,030 K. From evolutionary tracks, the mass of this star can be estimated as 2.2 ± 0.3 that of the Sun. A mass estimate using the interferometrically-measured radius and its spectroscopically-determined surface gravity yields 2.5 ± 0.9 solar masses. The star is known to undergo periodic variations in luminosity over roughly 4.6 days, with the astroseismic frequencies suggesting a much lower mass of 1.3 ± 0.3 solar. Estimated to be around 3 ± 1 billion years old Kochab was announced to have a planetary companion around 6.1 times as massive as Jupiter with an orbit of 522 days. This poster shows the optical spectrum of β UMi 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 λ in Angströms (1Å =0.1nm) 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=$\lambda/\Delta\lambda$=220,000 or approximately 1.4 km/s. Its average dispersion is 0.012 Å /pixel. Integration time with the LBT was 15 sec and consists of 3-12 exposures in all six cross dispersers. The signal-to-noise ratio (S/N) of the spectrum peaks at 2100:1 at 8250 Å and has a low of 200:1 near the blue cutoff. The exposure was obtained on May 23, 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/).



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