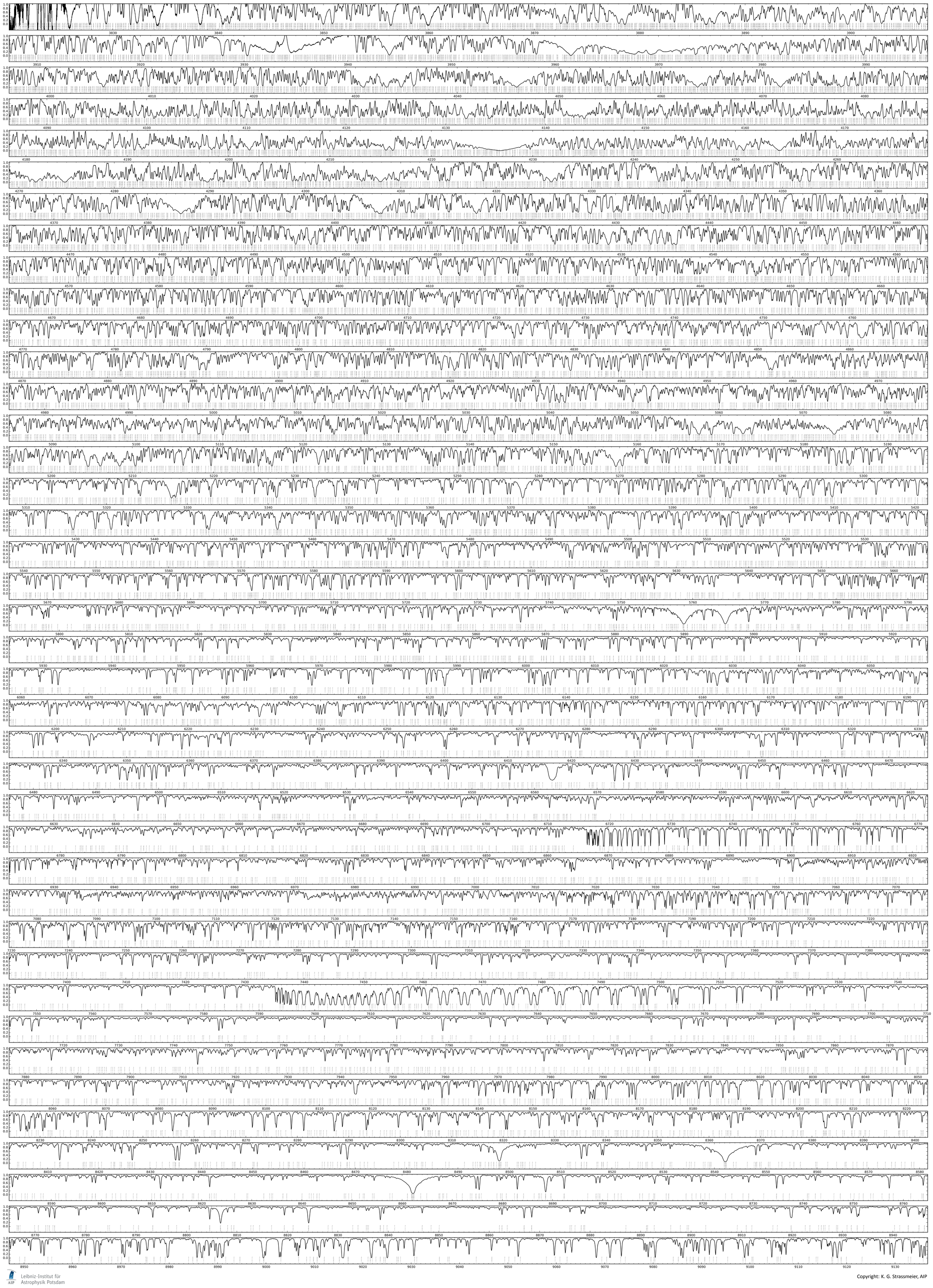
The fingerprint of a star: α Tau

α Tauri (87 Tau = HD 29139), also known by the name of Aldebaran, is a red K5 III giant. As such the collapse of the centre of the star into a degenerate helium core has ignited a shell of hydrogen outside the core and Aldebaran is now a red giant. It has expanded to 44 times the diameter of the Sun, equivalent to approximately 61 million km. Measurements of its parallax put Aldebaran around 65.3 light-years away. Stellar models predict it only has about 50% more mass than the Sun, yet it shines with 425 times the Sun's luminosity due to the expanded radius. Aldebaran is a slightly variable star, of the slow irregular variable type. It varies by about 0.2 mag in apparent magnitude. Its photosphere shows abundances of carbon, oxygen, and nitrogen that suggest the giant has gone through its first dredge-up stage—a normal step in the evolution of a star into a red giant during which material from deep within the star is brought up to the surface by convection. With its slow rotation, Aldebaran lacks a dynamo needed to generate a corona and hence is not a source of hard X-ray emission. This poster shows the optical spectrum of α Tau 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 10 sec and consists of 3-9 exposures in all six cross dispersers. The signal-to-noise ratio (S/N) of the spectrum peaks at 3480:1 at 8250 Å and has a low of 550:1 near the blue cutoff. The exposure was obtained on October 1, 2016. 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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