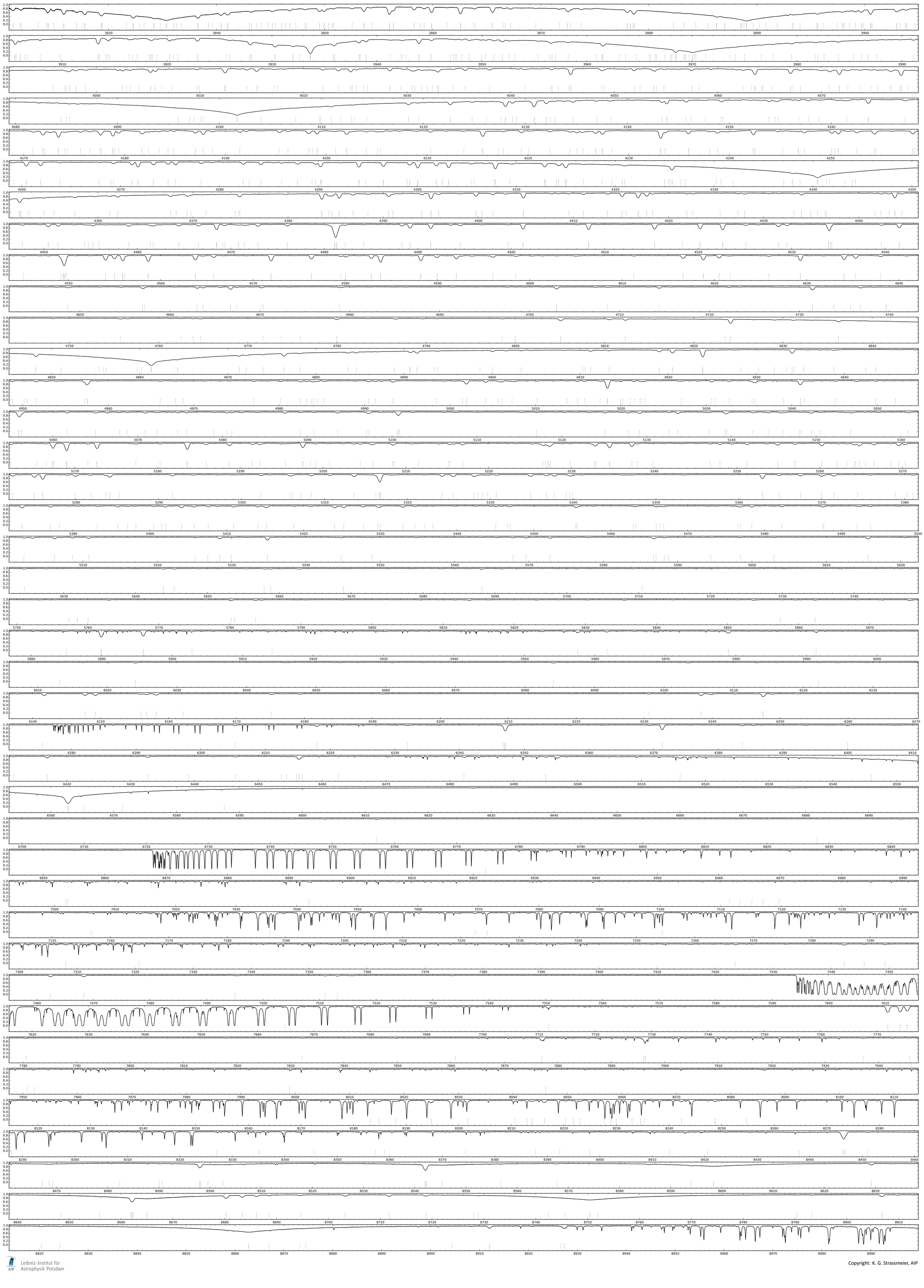
The fingerprint of a star: Sirius = α CMa

Alpha Canis Majoris (α CMa = 9 CMa = HD 48915), better known as Sirius, is the brightest star in the Earth's night sky. Observing it with an 11.8m telescope like the LBT is a real challenge. What the naked eye perceives as a single star is in fact a binary system, consisting of a main-sequence star of spectral type A0 or A1, termed Sirius A, and a faint white dwarf companion of spectral type DA2, called Sirius B. At a distance of 2.6 parsecs (8.6 light years), the Sirius system is one of Sun's near neighbors. Sirius A is about twice as massive as the Sun and is 25 times more luminous than the Sun. The system is between 200 and 300 million years old. Sirius A is classed as an Am star because the spectrum shows deep metallic absorption lines, indicating an enhancement in elements heavier than helium, such as iron which is 316 % as abundant as in the Sun's atmosphere. The spectrum would be classified as A1 from hydrogen and helium lines, but A0 from the metallic lines that cause it to be grouped with the Am stars. This poster shows the optical spectrum of Sirius A 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 (1 Å = 0.1 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 = $\lambda/\Delta\lambda$ = 220,000 or approximately 1.4 km/s. Its average dispersion is 0.012 Å/pixel. Integration time with the LBT was 1 sec and consists of a single exposure in all six cross dispersers. The signal-to-noise ratio (S/N) of the spectrum peaks at 800:1 at 4000 Å and has a low of 450:1 near 8000 Å. The exposure was obtained on October 16, 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. Note that the annotation text appears darker the stronger the line. The line identifications and the wavelengths were taken from the Vienna Atomic Line Database. The original spectrum has been published in Astronomy & Astrophysics (Strassmeier, K. G., Ilyin, I., & Weber, M. 2018, A&A; see https://pepsi.aip.de/).



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