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INFRARED OBSERVATIONS OF EPSILON AURIGAE

In the night of Dec. 14, 1983, ε Aur and six other stars were observed with TIRGO, a 1.5-m telescope installed on the Gornergrat (Switzerland). A circular variable filter and an InSb photocell permit observations in 37 steps between λ = 2.84 and 4.20 μm. After having allowed for the transmittance of the filters and assuming a constant quantum efficiency of the cell in this range of wavelengths, the observations of the six stars were then compared with Planckians calculated according to a colour-T_{eff} calibration (Böhm-Vitense 1981), thus a normalized mean atmospheric transmittance curve was deduced (Figure 1). For the reduction to an international system, available L magnitudes were collected from the literature and the following reduction

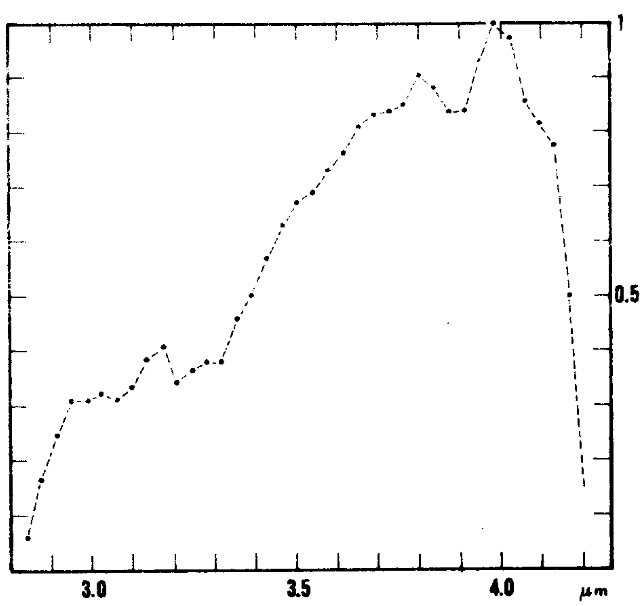

Figure 1

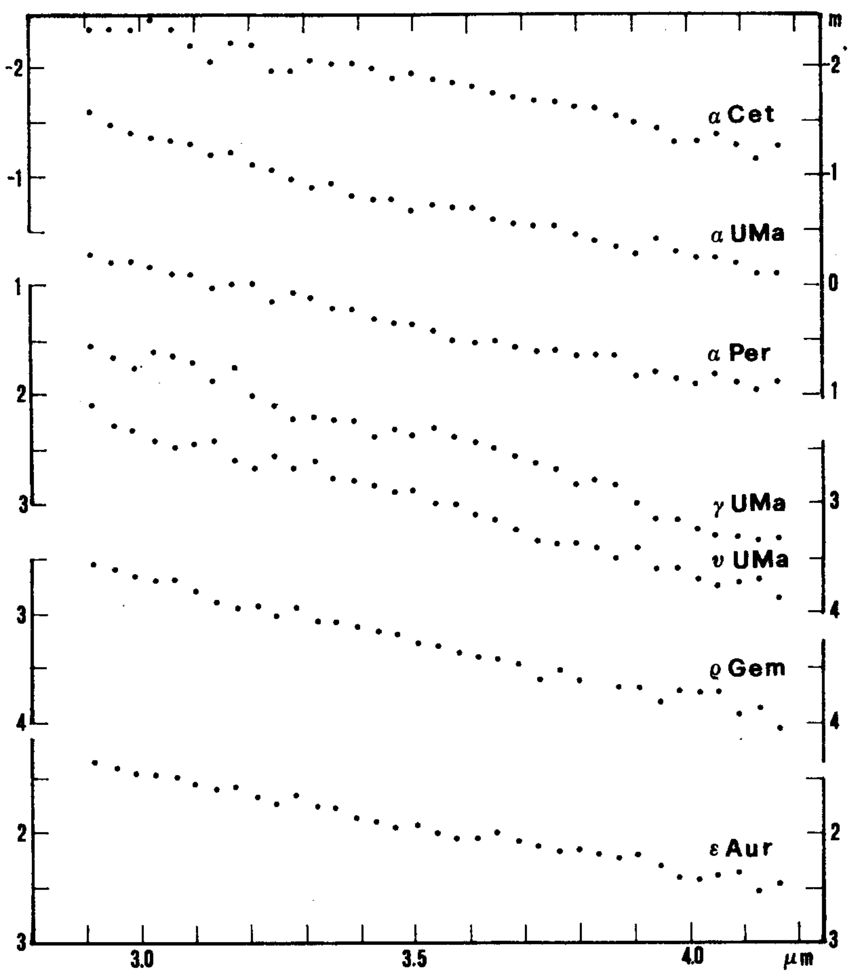

Figure 2

formula was used 8.26-2.5 log l, l corresponds to the counts corrected for the transmittance of filters and atmosphere. All stars were observed around their upper culmination. The arithmetical mean of all observations for each star, between 2.91 and 4.17 μm (central wavelength: 3.54 μm) are given in Table I, whereas the single reduced points are plotted in Figure 1. When the same procedure was applied to ε Aur, the observed values did not fit any Planck function for temperatures corresponding to its spectral type. After some attempts, two Planckians were adopted. The first was related to the spectral type of ε Aur and the other remained unchanged around a temperature of 700°K

Table I

L magnitudes

Star	Sp.type	this paper	other values	References
α Cet	M1.5III	−1.85	−1.74;−1.78;−1.87	Johnson et al. 1966, Lee 1970, Glass, 1974
α Per	F5Ib	+0.37	+0.48	Low and Mitchell, 1965, Johnson et al. 1966
ρ Gem	F0V	+3.27		
υ UMa	F0IV	+2.99	+2.98	Glass 1975
α UMa	K0III	−0.78	−0.78	Johnson et al. 1966
γ UMa	A0V	+2.44	+2.4	Woolf et al. 1970
ε Aur	F2Ib	+1.95	+1.25;+1.23	Low and Mitchell, 1965 Johnson et aL 1966

even changing the stellar temperature between 7200°K and 6740°K. The fit was satisfactorily good and the mean arithmetical magnitude 1.95 resulted, with a fitting error of ±0.04. Since the magnitude out eclipse is 1.25 (see Table I), the decrease within eclipse would be 0.7 magnitudes, which corresponds to 52% of the total magnitude of ε Aur. But, according to our model, the star still contributes for about 80% to the luminosity during eclipse and the remaining flux should come from the eclipsing body.

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