

AN INTERESTING NEW SOUTHERN PECULIAR A STAR — HD 137509

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A bright southern B star noted as peculiar from objective-prism plates is found to be rich in Si, Fe, Cr, and Ti but deficient in He.

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In the course of reclassification of the HD stars from Michigan Curtis Schmidt objective-prism plates, (108 \AA mm^{-1}) many interesting and unusual spectra have been noted. Bidelman and MacConnell (1973) called HD 137509 ($m_v \sim 6.7$) a Si star, but N. Houk finds the spectrum to be that of a late B star rich with prominent lines of Si II and Fe II as well as numerous weaker features. Further it is possible that a strong feature near $\lambda 4160$ changed noticeably in intensity between the plates, although an emulsion defect cannot be entirely ruled out. From the weakness of the He I and the strength of H, the spectral type must be near B9. The H wings indicate a luminosity above the main sequence; this is typical for peculiar A stars. Ca II is extremely weak and C II lines are present so the temperature class is probably not as late as A0. Although the spectrum on our plates is quite unusual, no peculiarities were noted in the HD catalog.

On 1975 March 31.4 UT a 9 \AA mm^{-1} plate was obtained with the 60-inch coudé at Cerro Tololo Inter-American Observatory. Using the variable scan oscilloscope display machine, ARCTURUS, at the DAO, we have measured 148 stellar lines between 3712 \AA and 4805 \AA . Almost every feature could be identified; we find the following elements in addition to hydrogen to be present.

Element	Multiplets	Remarks
C II	4, 6	4 lines definitely identified
Mg II	4	Only $\lambda 4481$
Si II	1, 3	These lines are strong
Si III	2	Only $\lambda 4552$ weakly present
Ca II	1	Only the K line weakly present; the H line is too weak to be seen in the broad He line.
Ti II	11, 12, 13, 14, 19, 20, 31, 34, 40, 41, 50, 72, 82, 87, 92 104, 105, 115	
Cr II	11, 18, 19, 20, 26, 31, 44, 117, 144, 161, 162, 165, 167, 183, 193, 194	
Fe II	27, 28, 37, 38, 43, 126, 127, 154, 173, 186, 190, 192	

No lines whatsoever of He I could be found. However the presence of C II, and perhaps Si II, suggests that the star is hot enough so that helium should be visible at this dispersion. We conclude that like many other hot peculiar stars, the atmosphere of HD 137509 is deficient in

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helium. The star is noteworthy in the richness of metallic lines. However, no rare earths seem to be present. Neither manganese nor mercury are seen, thus the star is not spectroscopically related to the hot Hg-Mn Ap stars.

This star appears to be most similar to the silicon stars, although the many strong ionized metallic lines are quite unusual. On our coude plate all lines are noticeably broadened. We estimate the apparent rotation ($V \sin i$) to be about 40 km sec^{-1} from the width of the lines as

measured on the oscilloscope display. Many silicon stars show rotational broadening of about this amount.

From 30 lines the radial velocity of the star is found to be $+0.5 \pm 0.8 \text{ km sec}^{-1}$.

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REFERENCE

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