THE METALLIC-LINED STAR 32 AQUARII

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ABSTRACT. Prelimary results from an optical region study of the metallic-lined star 32 Aquarii indicate T_{eff} = 7600 K, log g = 3.10, ξ = 4.6 km s^{-1}, and an iron abundance about one-half solar.

1. INTRODUCTION

32 Aquarii (HD 209625 = HR 8410) is a sharp-lined single-lined spectroscopic binary (v sin i = 19 km s^{-1}) which is a member of the Ursa Major Stream (Hoffliet 1982). One of us (SJA) obtained 3 4.3 Å/mm well-widdened IIaO spectrograms of this star with the coude spectrograph of the 2.5-m telescope of Mt. Wilson Observatory. These plates were traced with the PDS microdensitometer at Kitt Peak National Observatory. This data was used to produce intensity vs. wavelength plots.

2. LINE IDENTIFICATIONS

The lines were identified on these tracings with the aid of standard sources, especially A Multiplet Table of Astrophysical Interest (Moore 1945) and Wavelengths and Transition Probabilities for Atoms and Ions, Part I (Reader and Corliss 1980). There are approximately 1500 lines in the wavelength interval λλ3820-4630. We have identified lines of the following atomic species: H I, Mg I, Mg II, Al I, Si I, Si II, Ca I, Ca II, Sc II, Ti I, Ti II, V I, V II, Cr I, Cr II, Mn I, Mn II, Fe

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C. R. Cowley et al (eds.), Upper Main Sequence Stars with Anomalous Abundances, 455–457.

I, Fe II, Co I, Ni I, Ni II, Sr I, Sr II, Y II, Zr II, Ba II, La II, Ce II, Pr II, Nd II, Sm II, Eu II, Gd II, and Dy II.

3. INITIAL RESULTS

We have also compared the spectrophotometric measurements of Lane and Lester (1980) and the Hγ profile as derived from our optical region spectrograms with the predictions of Kurucz's (1979) fully-line blanketed solar composition model atmospheres. The best match occurs for T_{eff} = 7600 K and log g = 3.10 as shown in Figures 1 and 2. The use in our final analysis of the same sources of oscillator strengths and damping constants as the analyses of other B and A stars with similar spectroscopic material (Adelman 1984, 1985) will aid the determination of abundance anomalies and the comparison with HgMn and hot Am stars.

We have completed measuring the equivalent widths of the Fe I and Fe II lines. For each atomic species, the microturbulent velocity was found from the requirement that the derived abundances should not depend on the size of the equivalent widths. From 25 Fe II lines, we found ξ = 4.5 km s^{-1} and log Fe/H = -4.50 ± 0.26 while from 177 Fe I lines, ξ = 4.7 km s^{-1} and log Fe/H = -4.75 ± 0.19. The analysis of lines of other atomic species is in progress.

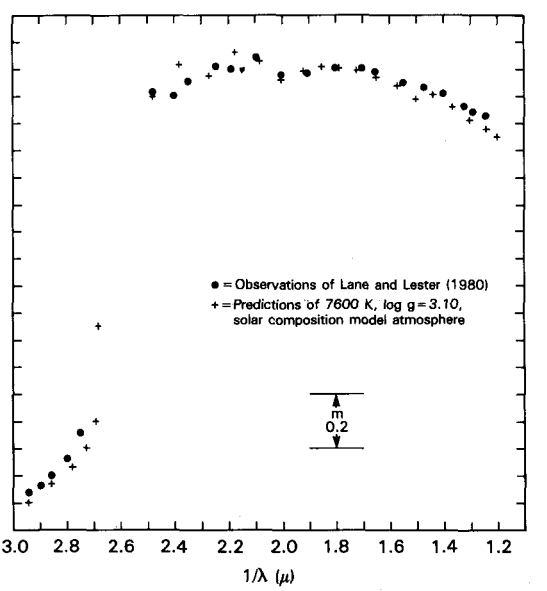

Fig. 1 The optical region energy distribution of 32 Aqr compared with the predictions of a 7600 K, log g = 3.10 solar composition model atmosphere.

https://doi.org/10.1017/S025292110009196X Published online by Cambridge University Press

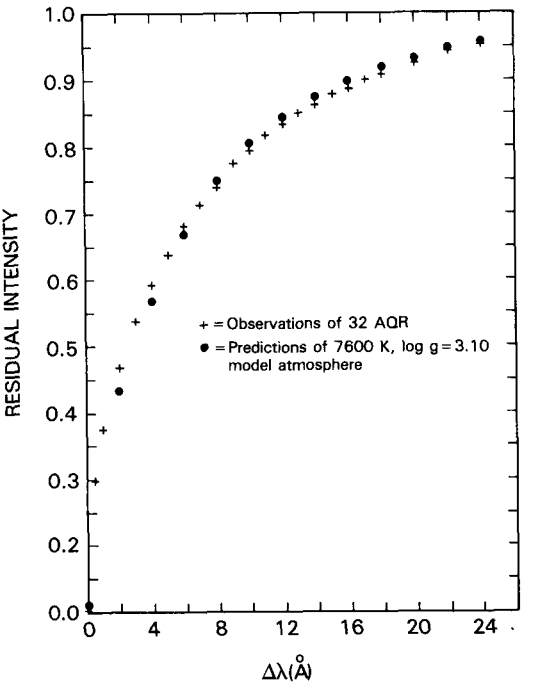

Fig. 2 The Hγ profile of 32 Aqr derived from measurements of the spectrograms compared with the predictions of a 7600 K solar composition model atmosphere.

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https://doi.org/10.1017/S025292110009196X Published online by Cambridge University Press