

HST/STIS spectroscopy of the magnetic Of?p star HD 108: the low state at ultraviolet wavelengths

W. L. F. Marcolino, J. -C. Bouret, N. R. Walborn, I. D. Howarth, Y. Naze, A. W. Fullerton, G. A. Wade, D. J. Hillier, A. Herrero

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We present the first ultraviolet spectrum of the peculiar, magnetic Of?p star HD 108 obtained in its spectroscopic low state. The new data, obtained with the Space Telescope Imaging Spectrograph (STIS) on the Hubble Space Telescope, reveal significant changes compared to IUE spectra obtained in the high state: N V 1240, Si IV 1400, and C IV 1550 present weaker P-Cygni profiles (less absorption) in the new data, while N IV 1718 absorption is deeper, without the clear wind signature evident in the high state. Such changes contrast with those found in other magnetic massive stars, where more absorption is observed in the resonance doublets when the sightline is close to the plane of the magnetic equator. The new data show also that the photospheric Fe IV forest, at 1600–1700 angstroms, has strengthened compared to previous observations. The ultraviolet variability is large compared to that found in typical, non-magnetic O stars, but moderate when compared to the high-/low-state changes reported in the optical spectrum of HD 108 over several decades. We use non-LTE expanding-atmosphere models to analyze the new STIS observations. Overall, the results are in accord with a scenario in which the optical variability is mainly produced by magnetically constrained gas, close to the photosphere. The relatively modest changes found in the main ultraviolet wind lines suggest that the stellar wind is not substantially variable on a global scale. Nonetheless, multidimensional radiative-transfer models may be needed to understand some of the phenomena observed.

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Email: wagner@astro.ufrj.br