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Spectroscopic Determination of Stellar Rotation.

To the Editor of Astro-Physics:

DEAR SIR: The widening of the lines in the spectrum of a star is generally ascribed to high temperature; and, no doubt, most of it is due to this cause; but must not a certain part be due to axial rotation? To make my meaning clear, suppose a distant star, situated in the plane of our Sun's equator, and suppose there to be an observer in this star, examining the light of our Sun with a good spectroscope; then one edge of the disc would be advancing towards him with a velocity of a little over one mile per second, while the other edge would be retreating with the same velocity. Other portions of the disc would be moving with intermediate velocities; so that the total effect would be to broaden out a fine line into a band, whose width would correspond to the algebraic difference of these velocities, viz., two miles a second. A similar effect ought to be visible to us, when examining the spectrum of a star, except in the improbable case of our being situated nearly in the prolongation of the stellar axis. In general, this effect would be mixed up with the widening produced by high temperature, so that it would be impossible, or nearly so, to separate the two. It seems to me, however, that even in this case something might be done with a telescope of large aperture and a spectroscope of considerable dispersive power, by the aid of the considerations that the broadening due to rotation ought to affect all lines equally, and that the distribution of intensities in different parts of the band ought to follow a uniform and easily deducible law. But in the case of variable stars, like Algol, where the diminution of light is supposed to be due to the interposition of a dark companion, it seems to me that there ought to be a spectroscopic difference between the light at the commencement of the minimum phase, and that of the end, inasmuch as different portions of the edge would be obscured. In fact, during the progress of the partial eclipse, there should be a shift in position of the lines; and although this shift is probably very small, it ought to be detected by a powerful instrument.

J. R. HOLT.