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ABSTRACTS *

Billings, Bruce H. A tunable narrow band optical filter.

Previously, polarization filters have been designed which have an aperture of several centimeters and a transmission band only a fraction of an Angstrom wide. In this paper, an improvement on such a filter will be discussed which makes it possible to use electrical controls to set the passband at any point over a considerable range. The active elements of the filter consist of a series of plates of a crystal of high electro-optic coefficient which are paired with the customary filter elements. The passband can be shifted in a fraction of a millisecond.

It is proposed that the filter be used to study that component of the motion of solar prominences which lies along the line of sight. In this application, the filter would be combined with a Lyot type coronagraph. Photographs would be taken every few minutes with the filter peaked at $H\alpha$, $H\alpha + \frac{1}{2} \text{ \AA}$, $H\alpha + 1 \text{ \AA}$, etc. From the Doppler shift, the velocity along the line of sight of various parts of a prominence could then be determined and from a series of such velocity determinations the actual position of the prominence could be calculated.

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Cambridge, Mass.*

Hiltner, W. A. A Wolf-Rayet star of special interest.

The spectrographic orbit of the faint Wolf-Rayet star (1945) $\alpha = 22^{\text{h}}07^{\text{m}}6$, $\delta = +57^{\circ}26'$ has been determined at the McDonald Observatory. The period of the system is 2.1 days and the semi-amplitude is 290 km/sec. The early type companion is probably responsible for the source of lines of the Balmer series of hydrogen in the ultraviolet.

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Williams Bay, Wis.*

Irwin, John B. Tables for least-squares solutions of eclipsing binary light-curves.

A complete least-squares solution of an eclipsing binary light-curve is so laborious that its use is probably justified only in the case of photo-electric observations. A large percentage of the computational time of such a solution is spent in computing the coefficients $\frac{\partial f_1}{\partial r_1}$, $\frac{\partial f_1}{\partial r_2}$, $\frac{\partial f_1}{\partial(\cos^2 i)}$, $\frac{\partial f_1}{\partial u}$, appearing in the equations of condition, which, in Kopal's¹ notation, are of the form

$$\Delta l_{(O-C)} = -f_1 \Delta L_1 - L_1 \left\{ \frac{\partial f_1}{\partial r_1} \Delta r_1 + \frac{\partial f_1}{\partial r_2} \Delta r_2 + \frac{\partial f_1}{\partial(\cos^2 i)} \Delta(\cos^2 i) + \frac{\partial f_1}{\partial u} \Delta u \right\},$$

where

$$\frac{\partial f_1}{\partial w} = \frac{3(1-u)}{3-u} \frac{\partial f_1^U}{\partial w} + \frac{2u}{3-u} \frac{\partial f_1^D}{\partial w},$$

and

$$\frac{\partial f_1}{\partial u} = \frac{6(f_1^D - f_1^U)}{(3-u)^2}.$$

$$w = r_1, r_2, \cos^2 i,$$

These differential coefficients are functions of the unknowns themselves and are also certain combinations of $\frac{\partial \alpha}{\partial p}$ and $\frac{\partial \alpha}{\partial k}$, which were evaluated by appropriately differencing the Zessewitsch tables.² Multiplied by certain simple combinations of r_1 , k , and $\cos^2 \theta$, the coefficients were tabulated as functions of the well-known variables, k and p . A completely independent check of the final tables was obtained by making use of Kopal's associated-alpha functions.³

Because the coefficients are different, depending upon whether the eclipse is an occultation or

* Of papers presented at the Seventy-sixth Meeting of the American Astronomical Society, Cambridge, Massachusetts, December 26 to 30, 1946.