

Determination of Times of Second and Third Contact from Flash Spectrum Sequence

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Abstract

The predicted times of contact of a total solar eclipse have uncertainty of a few seconds due to (i) irregular profile of the lunar limb, (ii) difference between the geometrical and gravitational centres of the Moon's disc and (iii) possible variation in the adopted value of solar diameter. An experiment was conducted to determine the times of second and third contact by recording the flash spectrum sequence for comparison with the predictions for our camp at Robertganj. The equipment included a 16 mm movie camera loaded with 100 ASA colour negative film, a 60° prism, digital clock synchronised with radio time signals and safety filters. The entire sequence of the flash spectrum shows that H-alpha in emission begins to appear from 8^h40^m30^s. Strong emission in Helium (5876 Å) can be seen at 8^h40^m45^s. Numerous emission lines flash out against very faint continuum at 8^h40^m46^s marking the beginning of totality. Second flash begins at 8^h41^m37^s during totality. Multiple emission lines flash against very faint and narrow continuum at 8^h41^m41^s marking end of totality. The computed times and actual duration of totality after correction for lunar limb profile have been found to be in agreement to within a second with observed times.