ROCKET EXPERIMENT WITH ELECTRONIC CAMERA FOR STUDYING THE METALLIC DISCONTINUITIES IN THE ULTRAVIOLET SPECTRUM OF 'A' STARS

M. COMBES
Observatoire de Paris, Meudon, France

Abstract. 1. Ultraviolet spectra (1400–1800 Å) of Ap, Am and normal A stars are needed by F. Praderie, R. Bonnet and R. Cayrel.

The spectral resolution has to be nearly 1 Å. Accurate relative photometry (5%) and absolute calibration (30–50%) are required.

A rocket experiment, proposed to ESRO by M. Combes and P. Felenbok is planned for launch in 1972.

2. As neutral silicon and magnesium are very efficient ultra-violet absorbents, A stars ultraviolet fluxes are very faint (Praderie, 1968).

Then a very luminous optical set-up and a high efficiency receiver have to be used. A 30 cm in diameter concave objective grating is associated with a Lallemand electronic camera. The grating (2000 *l*/mm; *f*/1) is holographically made (Labeyrie, 1969). The electronic camera is electrostatically focussed. A semi-transparent solar-blind CsI photocathode is used (Carruthers, 1966).

3. A little mirror, placed against the grating and forming a direct view of the sky, permits to establish an absolute wavelength scale.

During the fly, before and after stellar observations, a little concave mirror mounted into the opening side-door is used to form on the photocathode a spectrum of a Deuterium calibrated lamp. Two photomultipliers, one on each side of the electronic camera, control the lamp stability.

The complete mounting is calibrated in the laboratory using a thermopile as reference, before the launch and after the recovery of the waterproof payload.

4. The chosen stars are the brightest Ap and Am stars: α Dra (Ap; $m_v = 3.64$; equivalent type A 0) and α^2 Lib (Am; $m_v = 2.75$; equivalent type A3–A7).

It seems to be possible to obtain spectra (1400–1800 Å) of the Ap star with a spectral resolution of 1 Å and a signal to noise ratio better than 40. But at a pinch one may accept a resolution of 2 Å and a signal to noise ratio of 15 for the shortest range of the Ap star spectrum.

References

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DISCUSSION

J. W. Campbell: What are the characteristics of the calibration lamp which you plan to use in the rocket?

M. Combes: I am not sure but I think the infly calibration lamp is a Deuterium lamp.

N. Roman: (1) When will the rocket fly? (2) Why is the experiment so much less sensitive at 2000 Å than at 1800 Å?

M. Combes: The experiment is planned for launch in the second half of 1972. (2) The quantum of efficiency of CsI decreases quickly near 2000 Å. It is a solar blind cathode.

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