CCDV, What Is It?

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Abstract On-site experience obtaining rough magnitude estimates with the Starlight Xpress CCD system and problems blocking infrared radiation are described.

1. Introduction

Clinton B. Ford for many years traveled from Connecticut to California twice a year to a mountaintop observatory to follow faint Miras to 17th magnitude with the 18-inch *f*/7 telescope. I can observe fainter stars from light-polluted Lakewood, near Los Angeles, California, at sea level, with my 12.5-inch *f*/6 telescope equipped with the Starlight Xpress CCD camera!

But this marvelous technical advance has a glitch: the CCD chip does not "see" like the human eye, but rather is very red- and infrared-sensitive. This is wonderful for penetrating the atmosphere of Mars, or for observing IR objects, but not for photometry of visual standards, or for clean tricolor separations. Filtering is difficult in this direction, since it is easier to filter short wavelengths than to filter long wavelengths and still leave the shorter ones intact.

It should be noted that my experience with only one interference-type IR blocking filter, with non-highly red, and/or non-IR emitting objects, gives good visual response results, and adding appropriate green filtering gives excellent visual results (Royer 1996).

2. Results

After much experimentation and expense in purchasing many filters, I can share the following results:

1. Camcorder chips are better balanced for visual, but not good enough.
2. Dye and dichroic visual range filters do not block IR light.
3. Stacking IR-blocking filters helps some.
4. Green or visual filters increase the problem, since they attenuate the other wavelengths, but the IR leak remains constant.
5. Stacking Schott glass KG 5 infrared-blocking filters will work best, but I have only two of these of 0.140-inch thickness. One or two more should give excellent results at some light loss, according to the specifications of the filter, but I have not tried this in the field due to the great expense of purchasing more.

CCDV, what is it? It is still a dream, so far as I know. Any new information or suggestions?

3. Addendum, 2006

At the AAVSO Spring Meeting held in Sion, Switzerland, in 1997, I received a suggestion from Giancarlo Favero of the University of Padova, Italy. He said I needed more thickness of the Schott KG 5 glass. So after experimenting with this, I found that a thickness of 15 mm is adequate (stacking filters) together with a Kodak heat absorbing filter #301 used in the carousel projector. This is very close to real eye visual with the Sony ICX027BL chip used in the original Starlight Xpress camera.

Of course there is light loss with this much filtering, and very red or blue stars still are not truly visual. So a true CCDV is obtainable, and visual chart magnitudes can be used, but you have to know the spectral response of your chip, your filters, and the human eye.

Reference

Royer, R. 1996, *J. Amer. Assoc. Var. Star Obs.*, **24**, 64.