

Simultaneous imaging in optical and near-IR bands

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Abstract. It is very important to have simultaneous observations in optical and near IR bands to understand several astrophysical phenomena. One problem is to know the nature of the central engine in blazars, which are in general violently variable sources. Variability study in spectral bands, separated widely, is very important to understand the physics of the central engine. The dominant emission mechanism in the BL Lac objects is known to be synchrotron emission. The cooling time scales for the electrons depend upon the wavelength of emission. In order to test this hypothesis, one needs to make simultaneous observations in widely separated wavebands.

Keeping this aspect in mind, we have developed an imaging system with two channels - one channel for visual band and other for the near infrared. A beam splitter splits the light from telescope into two components. The visual light beam (reflected) goes to CCD camera and near IR beam (transmitted) to IR camera (NICMOS3), enabling both to be recorded simultaneously. The software to control two instruments simultaneously is developed in house. Test runs have already been conducted.

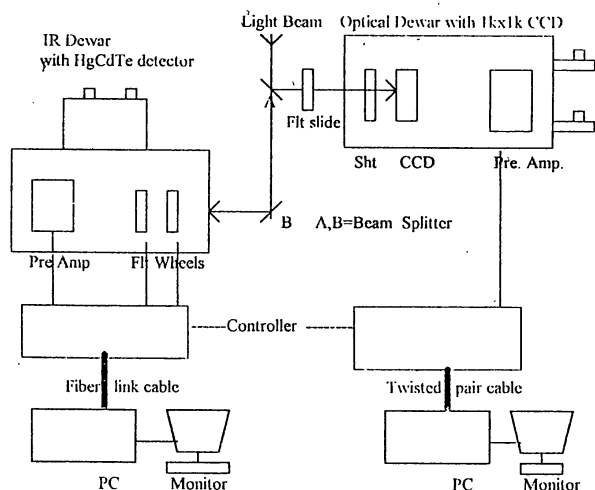


Figure 1. System Description : As shown in electronics system block diagram. F13 beam coming from telescope is divided by beam splitter (A), from where optical signal will be reflected to CCD (1kx1k) for visible band (0.3 - 1.1 μ m) imaging. Near IR beam (1.1 - 2.35 μ m) transmitted by beam splitter A and reflected by cold mirror (B). The reflected beam will travel toward HgCdTe detector for near IR imaging with different set of filters (J,H,K,K', narrow band). For visible and U.B.V.I.R. filters are used. A fiber cable from IR controller and a twisted pair cable from optical controller are used for remote control operation of both the systems from control room. Two PCs give simultaneous images of the same object having specified integration time.