

## PROBLEMS OF INFRARED EXTINCTION AND STANDARDIZATION

Joint Commission Meeting of Commissions 25 and 9

held on August 4, 1988

Chairman and editor: *E.F. Milone*

Scientific Organizing Committee: *R. Bell, M.S. Bessell, T.A. Clark, I.S. Glass, R.L. Kurucz, I.S. McLean, F. Rufener, A.T. Young.*

A short report by *E.F. Milone*

An abstract of A.T. Young's paper

## PROBLEMS OF INFRARED EXTINCTION AND STANDARDIZATION: A Short Report

E.F. Milone  
University of Calgary  
Calgary AB T2N 1N4 / Canada

The effects of the Earth's atmosphere on infrared radiation from astronomical sources and the nature of problems in recovering and standardizing such data were the topics discussed at this joint meeting.

A major extinction difficulty in the infrared is the failure of a linear extinction law (or any other law based on Bouguer data taken at air masses  $\geq 1$ ) to properly predict the outside-the-air magnitude in the broadband infrared. Various strategies have been suggested to overcome this difficulty, but the complications it causes for transformations may contribute to problems for IR standardization, which arise when attempts are made to combine data obtained from different sites with different photometry systems.

The wavelength interval considered was the near infrared and most speakers treated only the JHKLM passbands in the 1-5  $\mu\text{m}$  region. The papers explored the sources and potential solutions of the problems created by the nature of atmospheric extinction in the near IR and with the difficulties of standardization. They therefore represented a reasonably balanced picture both of how the problems are currently dealt with and with how they might be improved. The program was opened by the chairman, who introduced the topic and the papers which followed. The first major address was entitled *Extinction and Transformation* by Andrew T. Young (San Diego State University). This talk discussed the difficulties inherent in obtaining appropriate extinction corrections for the broad-band JHKLM passbands in current use and suggested remedies. An abstract of Dr. Young's paper follows this report. The other papers given at this meeting were: *Models of Infrared Atmospheric Extinction* by K. Volk (NASA Ames), T.A. Clark and E.F. Milone (University of Calgary); *Atmospheric Extinction in the Infrared* by Ronald J. Angione (San Diego State University); *Infrared Extinction at Sutherland* by I.S. Glass and B.S. Carter SAAO); *Near-Infrared Extinction Measurements at the Indian Observatory Sites* by N.M. Ashok (Physical Research Laboratory, Ahmedabad); *Determining Solar and Stellar Spectra Above the Atmosphere by Computing Atmospheric Transmission* by Robert L. Kurucz (Harvard-Smithsonian Center for Astrophysics); *JHKLM Photometry: Standard Systems, Passbands and Intrinsic Colors* by M.S. Bessell and J.M. Brett (Mt. Stromlo and Siding Spring Observatories); and *Standardization with Infrared Arrays* by Ian S. McLean (UKIRT). The latter paper explored the difficulties faced by infrared image processing work. Several papers argued for the importance of modelling the atmosphere at the time of observation, making water vapour measurements a necessity. The meeting concluded with a final *Summary* by Roger Bell (Univ. of Maryland).

Prior to Dr. Bell's summary, there was a 10-minute general discussion. A repeated theme, starting with the undersampling theorem of Dr. Young, and reprised in the concluding remarks of Dr. Bell, emphasized the importance of reexamining the placement and width of the current JHKLM system of broad-band filters which are not confined to the cleanest portions of the atmospheric infrared windows. In light of the difficulties certain to be faced by any attempt to proclaim any existing standard system as the preferred one for JHKLM work, the possibility of redefining such a system based on better passbands, seemed to have wide appeal among the participants.

The full texts of all the papers submitted questions and their responses, and other relevant material will be published elsewhere<sup>2</sup>.

---

<sup>2</sup>Springer Verlag / Publishers, New York Inc., USA