



Salahaddin University- Erbil

Optical Properties of Interstellar Dust Grains In Orion Nebula

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By

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Abstract

The results of a study of interstellar extinction (absorption + scattering) has presents in the visible to near infrared region ($0.45\mu\text{m}^{-1} \leq \lambda^{-1} \leq 2.91\mu\text{m}^{-1}$) based on a photometric study of 98 stars in Orion nebula. Absolute visual extinction A_v for individual stars for selected stars is deduced by two methods based on:

- (1) the van de Hulst theoretical curve 15.
- (2) and the empirical formula of Cardelli, Clayton, and Mathis.

In present work has been conclude that the relation $A_v=1.1E(V-k)$ based on the van de Hulst theoretical curve, provides a reliable and simple way to estimate A_v for individual stars. Also the value of ratio of total to selective extinction $R_v = A_v / E(B-V)=3.15$, which is in excellent agreement with previous investigations of diffuse clouds obtained by other researchers. Previous results have been confirm which suggest extinction curves converge to a single functional form in the infrared region ($0.45\mu\text{m}^{-1} \leq \lambda^{-1} \leq 1.11\mu\text{m}^{-1}$), well described by a power law with $\alpha= 1.834$, and it is a good representation of the extinction at these wavelengths range. An empirical relation between A_v and colour excess $E(V-K)$ has been deduced, which is used in determining A_v for highly obscured objects.

Present work show linear polarization for more than 70 stars for selective stars, one can deduce that most of the stars have significantly small linear polarization compared with interstellar maximum line of polarization, also present linear polarization for three stars for selected sample, namely, (HD 30652, HD 34748, and HD 37903) in the wavelength range 0.15 to 1 μm , from this deduce that the empirical law of Serkowski is a good interpretation of polarization of starlight in Orion nebula.