Dust Reddening, Diffuse UV maps and Modelling Dust Scattered Radiation in the Taurus

Narayanankutty[1], Sathyanarayanan[1]

[1]*Department of Physics, Amrita University 690525 India*

We have studied the dust reddening E(B-V) in the Taurus region with three all sky dust reddening maps, the *Schlegel et al. 1998*, the recent *PLANCK* and the latest 3D *Green et al. 2015*. We have observed that the *PLANCK* dust map has the advantage of matching with Arce & Goodman (1999) results in Taurus region while the most widely used *Schlegel et al. 1998* dust map is not a good choice to explre dust distribution in the region. We find that the *Green et al. 2015* overestimate the reddening than the *PLANCK* but we believe that it is an indication of clumpiness in the region which is very important while modelling the dust scattered radiation.

We have studied the diffuse ultraviolet background in the region with the latest diffuse GALEX observations. We have used the diffuse GALEX data by Murthy 2016 for the present work. Since most part of the diffuse Ultraviolet background is contributed by dust scattered radiation, we modelled dust scattering in the region with a Monte Carlo multiple scattering model. We have modelled the Milky-Way Galaxy as a 500x500x500 grid with a bin size size of 2pc. We further assumed the number density of Hydrogen nuclei at the galactic plane $n_H = 1$ cm^{-3} which falls exponentially with galactic latitude with a scale-height of 125 pc, independent of galactic longitude. We have modified the dust distribution in the vicinity of the Taurus with the *Green et al. 2015* dust reddening values. We have run a series of Monte Carlo code for different combinations of albedo (a) and phasefactor (g) to constrain these optical parameters of dust grains in the region.

We find that most part of the dust scattered radiation originates from the foreground (below 140 pc) and very little radiation originates from, within and behind the TMC assuming the cloud's heliocentric distance and thickness 140 pc and 20 pc respectively from the literature surveys. We have tabulated flux contribution from each bright stars towards the region. We have used the diffuse flux as a function of galactic longitude as a metric of goodness of fit of the model and find that the phase factor (g) is independent of the level of scattered radiation and the best fit albedo (a) is around 0.3.