

Radiation transfer simulation of circular polarization at the NIR/UV wavelengths

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Circular polarization (CP) at the ultraviolet (UV) wavelength induces the enantiomeric excesses. It is suggested that they initially cause the biomolecular chirality of amino acids. The excesses of L-acids are also discovered in meteorites, and it is proposed that the CP light in the interstellar medium is related to biologically homochirality. In the star-forming regions, the high degree of CP (>20%) at the near-infrared (NIR) wavelength induced by aligned dust grains is observed, but it is not known that it exists at the UV wavelength. In this study, we develop the radiative transfer code with the Monte Carlo technic, which follows a change of Stokes parameters in scattering/absorption processes by dust grains. We find that the high degree of the CP at the NIR wavelength is realized when the micron-size dust grains exist in the interstellar medium, and the CP degree of the UV light reaches 20% with sub-micron sized dust grains. We will discuss the relations of the CP degree between the NIR and UV wavelength.

Keywords: circular polarization, non-spherical dust grains, star-forming regions