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Comparison of the extraplanar H α and UV emissions in the halos of nearby edge-on spiral galaxies

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We compare vertical profiles of the extraplanar H α emission to those of the UV emission for 38 nearby edge-on late-type galaxies. It is found that detection of the “diffuse” extraplanar dust (eDust), traced by the vertically extended, scattered UV starlight, always coincides with the presence of the extraplanar H α emission. A strong correlation between the scale heights of the extraplanar H α and UV emissions is also found; the scale height at H α is found to be ~ 0.74 of the scale height at FUV. Our results may indicate the multiphase nature of the diffuse ionized gas and dust in the galactic halos. The existence of eDust in galaxies where the extraplanar H α emission is detected suggests that a larger portion of the extraplanar H α emission than that predicted in previous studies may be caused by H α photons that originate from H II regions in the galactic plane and are subsequently scattered by the eDust. This possibility raises a question in studying the eDIG. We also find that the scale heights of the extraplanar emissions normalized to the galaxy size correlate well with the star formation rate surface density of the galaxies. The properties of eDust in our galaxies is on a continuation line of that found through previous observations of the extraplanar polycyclic aromatic hydrocarbons emission in more active galaxies known to have galactic winds.

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Yes

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