THE APACHE POINT DIFFUSE BANDS SURVEY: EMISSION FROM THE RED RECTANGLE

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As an extension of our ongoing observational survey of the diffuse interstellar bands (DIBs), described in a series of talks at this meeting a year ago, we have carried out intensive spectroscopic observations at different positions within the Red Rectangle, a unique emission/reflection nebula associated with the star HD 44179. Emission lines from the Red Rectangle have been tentatively identified with DIBs, suggesting that the analysis of the emission bands might shed light on the nature and the identity of the DIBs carriers. Our new data, which have better spectral resolving power and S/N than previous observations, provide emission band profiles from various locations within the nebula, including the "whiskers" or bright arms of the cross-shaped pattern of the biconical nebula, and also selected locations within the nebula but between the whiskers. We will discuss the relationship between the DIBs and the emission bands in the Red Rectangle, in terms of both the general spectral distribution of DIBs as compared to the continuous emission (the so-called extended red emission, or ERE) and the specific matches of Red Rectangle emission bands and interstellar DIBs in absorption. We note a general coincidence between the ERE from the Red Rectangle and the overall distribution of DIBs with wavelength; and we critically evaluate earlier reports that some of the observed emission bands appear to coincide with known DIBs, with progressive wavelength shifts that may be attributed to varying rotational excitation in a moleculer carrier. We also examine the hypothesis that some of the DIB carriers are contributing to both the ERE and the emission bands in the Red Rectangle.