Tracing PDR properties and structure in the closest low metallicity galaxy: 30Doradus in the LMC.

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More complete knowledge of galaxy evolution requires understanding the process of star formation and interaction between the interstellar radiation field and the ISM in low metallicity environments. For example, lowering the metal abundance, as is the case in galaxies of the early universe, results in a lower dust galactic reservoir, hence, less shielding for the formation of the molecular gas necessary for star formation to proceed. A convenient laboratory to zoom into the various phases of the ISM to study the effects of low metallicity on the ISM properties, is our nearest neighbor, the Large Magellanic Cloud (LMC), which has a metallicity ½ that of solar. We have mapped several lines from PDR and ionized gas in the 30 Doradus region in the LMC. The new Herschel/PACS and SPIRE/FTS data, combined with Spitzer IRS spectroscopic maps, provide constraints for modeling the PDR gas, and the ionized gas, thus allowing us to construct a comprehensive, self-consistent picture of the density, radiation field, and ISM structure in the vicinity of one of the most massive star clusters in our local neighborhood, R136. We also investigate the role of X-rays and shocks as possible heaters for the gas. We find that the PDR structures in low metallicity galaxies will be small filling factors sitting in relatively large reservoirs of ionized gas. The ionized gas, a prominent reservoir in low metallicity galaxies, will play a very important role on large scales in galaxies.