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Towards an Improved Model of Diffuse Gamma-ray Emission from the Milky Way: mapping the dust, gas, and radiation field.

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The strongest WIMP annihilation signals are expected from the inner Milky Way, but foreground contribution from cosmic-ray interactions with the gas and radiation field are strongest there as well. Therefore, indirect detection has been hampered by insufficient knowledge of the diffuse gamma-ray foregrounds. Improved modeling requires a 3D map of gas and dust (for π^0 and brem photons) and a 6D map of the radiation field (for inverse Compton), along with models of cosmic-ray density in both protons/nuclei and electrons. Using observations of 650,000,000 stars from the Pan-STARRS1 survey, we are currently making a 3D map of the interstellar material and the stellar luminosity density. I will show our progress so far, and speculate about what could be done with future data to better understand the diffuse gamma-ray emission in our galaxy.

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