



Contribution ID: 98

Type: Poster

Mapping the extinction parameters of dust in the IC63 photodissociation region

Tuesday, 12 June 2018 14:12 (1 minute)

Photodissociation regions (PDRs) are parts of the ISM consisting of predominantly neutral gas, located at the interface between HII regions and molecular clouds. The physical conditions within these regions show variations on very short length scales, and therefore PDRs form ideal laboratories for investigating the properties and evolution of dust grains. Recently, observations of the IC63 PDR were carried out with HST, producing high-resolution images with WFC3 in seven broadband filters from the UV to the NIR. With these observations, we investigate for the first time how the extinction varies across a PDR.

IC63 is an excellent target for this analysis, thanks to its many background stars. In this talk, I will explain how we simultaneously fit the stellar parameters (spectral type, effective temperature and luminosity), and extinction parameters (A_V , R_V) for each of the observed background stars, based on an approach that was originally developed for the Panchromatic Hubble Andromeda Treasury (PHAT). These fits then allow us to make a map of the optical properties and the grain size distribution across the PDR, which indicates how these properties vary under the effect of the steep gradients in the physical conditions so typical for a PDR. I will discuss the impact of these results, as they may provide new constraints on the modeling of the formation and processing of dust in the ISM.

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Yes

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Session Classification: Poster Presentations

Track Classification: The creation and evolution of dust