Contribution ID: **32** Type: **Poster**

Large Interstellar Polarisation Survey

Tuesday 12 June 2018 14:14 (1 minute)

We study the variability of the dust characteristics from cloud-to-cloud in the diffuse ISM (arXiv:1711.08672). We took low-resolution spectro-polarimetric data obtained in the context of the Large Interstellar Polarisation Survey (LIPS, arXiv:1710.02439) towards 59 sight-lines in the southern hemisphere, and we fitted these data using a dust model composed of silicate and carbon. Particles sizes range from the molecular to the sub-micrometre domain. Large (>6 nm) spheroidal dust that are of prolate shape and made of silicate account for the observed polarisation curve (arXiv:1705.07828). For 32 sight-lines we complemented our data set with UVES archive high-resolution spectra, which enable us to establish the presence of single-cloud or multiple-clouds towards individual sight-lines. We find that the majority of these 32 sight-lines intersect two or more dust clouds, while eight of them are dominated by a single absorbing cloud. We confirm several correlations between extinction and polarisation characteristics and the dust parameters, but we find also several previously undetected correlations between these parameters that are valid only in single-cloud sight-lines (arXiv:1711.08672). We observe that interstellar polarisation from multiple-clouds is smaller than from single-cloud sight-lines, showing that the presence of a second or more clouds depolarises the incoming radiation. We find large variations of the dust characteristics from cloud-to-cloud. However, when we average a number of clouds we always retrieve similar mean dust parameters. Typical dust abundances of the single-cloud cases are [C]/[H] = 92 ppm and [Si]/[H] = 20 ppm. Further we present the status of our search of single-cloud sight-lines and discuss the impact of grain porosity on the extinction and to the optical-to-submmillimter polarisation.

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Session Classification: Poster Presentations

Track Classification: What is dust?