

# **The Three-Dimensional Structure of the Local Interstellar Medium: Reconstructing Our Most Recent Interstellar Past**

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The Local Interstellar Medium (LISM) is a unique environment that presents an opportunity to study general interstellar phenomena in great detail and in three dimensions. In particular, high resolution optical and ultraviolet spectroscopy have proven to be powerful tools for addressing fundamental questions concerning the origin, evolution, physical structure, and three-dimensional morphology of this local material. I will review the current status of the structure of gas in the solar neighborhood, including details of the CLOSE (Ca II LISM Optical Survey of our Environment) project, a large-scale ultra-high resolution survey of our nearby interstellar medium (ISM). The LISM also represents the material that the Sun has encountered in its most recent interstellar past, as well as the material we will encounter in our most immediate future. Therefore, the LISM is a critical component to understanding the ISM-planet connection. I will discuss the status of a program to reconstruct the interstellar density profile along the historical solar trajectory, using high resolution observations of the LISM. This work could ultimately lead to a deterministic history of the cosmic ray flux at the top of Earth's atmosphere, and provide an empirical test of the LISM-Earth connection. Since the LISM shares the same volume as practically all known extrasolar planets, understanding the three-dimensional morphology of the LISM is also critical to characterizing the interstellar environments around these planetary systems and the structure of their astrospheres.