

Porous interstellar dust in the solar system?

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Interstellar dust from the local interstellar cloud passes through the solar system from an apparent direction of 259° ecliptic longitude and 8° ecliptic latitude due to its relative velocity of 26 km/s between the cloud and the solar system. Although the composition and size distribution of interstellar dust grains are roughly known from astronomical observations many questions remain open, such as the relation between size distribution of in-situ measurements from Ulysses and the astronomical models, the shift in dust flow direction in 2005 as reported by Krüger et al. (2007), and the composition and morphology of the grains.

In this work we present the advancements made in understanding the local interstellar dust surrounding the Sun from comparing Ulysses ISD data with simulations for the whole observation period between 1992 and 2008. We find two different bulk populations before ca. 2002 and after 2002, where the bigger grains (the population described by Landgraf et al. (2000)) dominate the ISD flow before 2002, while a population of grains with higher charge-to-mass ratio dominate after 2002. We show (quantitatively) how the Heliosphere boundary regions play a crucial role in the filtering of these populations, and find from the data and the simulations indications that these grains may be porous. We conclude the talk with an overview of the experiments currently conducted in the lab with porous ISD analogues.