



## Modeling the interstellar dust flow through the solar system, implications for Stardust Mission

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Interstellar Dust (ISD) is the major ingredient in the formation and evolution of stars, solar systems and planets. Three types of ISD observations are currently made:

1. Astronomical observations (interstellar extinction and polarization, infrared emission of the dust [1])
2. In-situ observations (using impact ionization detectors and time-of-flight spectrometers on-board spacecraft like Cassini, Ulysses and Galileo [2])
3. Sample-return missions like Stardust [3] and the proposed SARIM Plus mission [4]

The flow of interstellar grains through the solar system is not constant, but varies during the solar cycle due to interaction of the interplanetary magnetic field with the charged ISD grains. Simulations of these interstellar dust flux variations were made by Landgraf et al. [5] with the aim of comparing the simulated flux with the Ulysses in-situ measurements. The total ISD flux of  $1.5 \times 10^{-4} \text{ m}^{-2}\text{s}^{-1}$ , measured by Ulysses, was used as a basis for a rough estimate of the ISD flux on the Stardust aerogel collectors [6].

This work focuses on the prediction of the ISD flux during the two collection periods of the Stardust mission in 2000 and 2002, with the aim of helping to characterize the collection of ISD grains in the aerogel collectors for the Interstellar Preliminary Examination (ISPE) [3]. We update the predictions of the ISD flux for Stardust using a new simulation tool, which follows the same equations of motion as in the Landgraf model, but which has been optimized for the Stardust predictions. The assumptions for - and the Stardust predictions themselves - are reviewed. Also predictions are made for the proposed SARIM Plus mission.

[1] B.T. Draine, 2009, ASP Conference Series, **414**, pp. 453-472

[2] R. Srama et al., 2004, SSR, **114**, Issue 1-4, pp. 465-518

[3] A.J. Westphal et al., 2009, 40th LPSC Conference, The Woodlands, Texas

[4] Srama et al., 2010, Proposal to ESA in response to the Call for a Medium-size mission opportunity for launch in 2022: "SARIM Plus"

[5] M. Landgraf et al., 1999, J.Geophys. Res., **108**, pp. 5-1

[6] M. Landgraf et al., 1999, P&SS, **47**, Issue 8-9, pp. 1029-1050