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Interstellar silicate particles measured by Cassini's Cosmic Dust Analyser at Saturn

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We measured contemporary interstellar dust using the Cosmic Dust Analyser (CDA) on-board the CASSINI spacecraft. For 36 detected interstellar dust grains, flux and mass distribution and the elemental composition of each individual grain was inferred. Mass spectra suggest a relatively homogeneous population of Mg-rich silicate grains, probably with iron inclusions, with an average of cosmic (i.e. close to solar and CI chondritic) abundance ratios of Mg, Si, Ca, and Fe. C and S-rich grains were not detected. As compositional variation is significantly smaller than expected for circumstellar dust grain populations found by searching for isotopic anomalies in meteorites, we conclude that our measurements represent a homogenised grain population, most likely by repeated processing such as shock destruction and recondensation in cold molecular clouds.

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