

Stellar Abundances in the Solar Neighborhood: The Hypatia Catalog

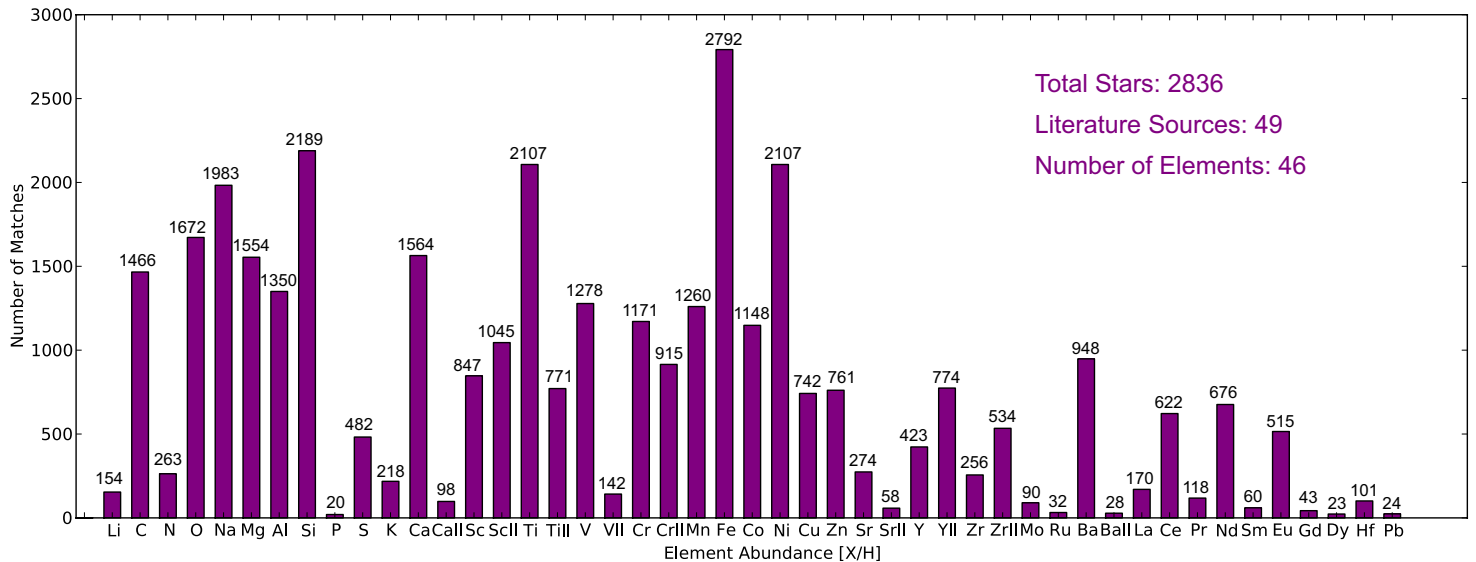


Fig. 1 - Number of stars in the Hypatia Catalog with measured abundances for 46 different element species.

We compile spectroscopic abundance data from 49 literature sources for 46 elements across 2836 stars in the solar e, within 150 pc of the Sun, to produce the Hypatia Catalog. We analyze the variability of the spread in abundance measurements reported for the same star by different surveys, the corresponding stellar atmosphere parameters adopted by the various abundance determination methods, and the effect of normalizing all abundances to the same solar abundance scale. The large number of stellar abundance determinations in the Hypatia Catalog allows us to quantify the magnitude of the scatter about the mean abundance trend for each element. Additional statistical analyses were also implemented to ensure robustness of the reported chemical abundance trends. No systematic correlations were found between stellar abundances and position, distance, or velocity.

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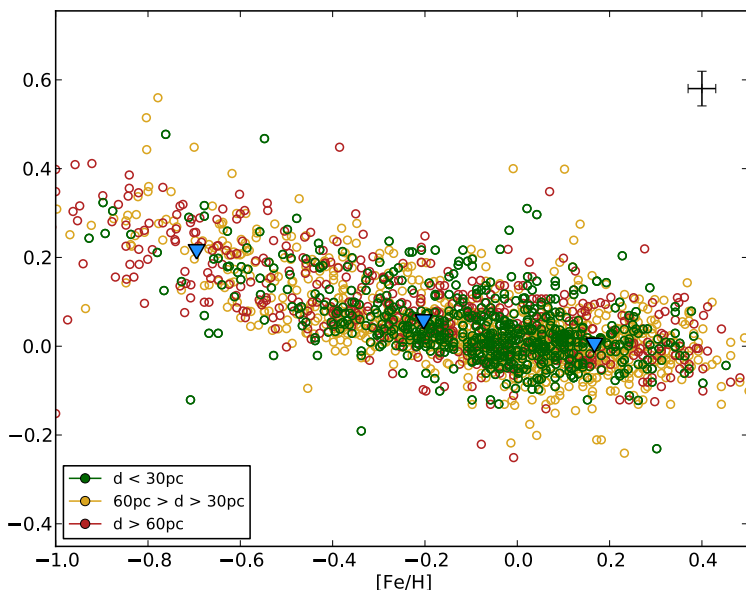


Fig. 2 - $[Si/Fe]$ ratio for stars in Hypatia as a function of $[Fe/H]$, with a representative observational uncertainty in the upper right. Median values are used when multiple catalogs list different abundance levels. Each abundance value is colored by the radial distance of the host-star. Blue triangles show the average abundance ratio value from all abundance values, not just the median, for three $[Fe/H]$ bins: < 0.2 dex, $[-0.2, 0.2]$ dex, and > 0.2 dex. The errorbar for each triangle is smaller than the size of the triangle. Like other α -elements, there is decrease in $[S/Fe]$ as $[Fe/H]$ increases from ≈ -1.0 dex to ≈ 0.4 dex. The scatter in $[S/Fe]$ is ≈ 0.4 dex over the entire $[Fe/H]$ range shown, but several outliers have a larger scatter.