Presolar Cosmic Dust in the Laboratory

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Abstract

Primitive asteroids and comets contain preserved within them as a rare component ancient dust grains that were part of the protosolar molecular cloud and survived the formation of the Solar System. Analysis of samples of these bodies (in the form of meteorites and spacecraft-returned samples) allows us to identify these grains and apply a myriad of advanced microanalytical techniques to their study. Extremely unusual isotopic compositions point to origins in different types of stars, especially asymptotic giant branch stars and supernovae, and they serve as a powerful tool for studying a wide range of astrophysical processes. Detailed studies of their compositions and atomic structures provide ground truth for astronomical observations of circumstellar and interstellar dust. This talk will provide a historical perspective on presolar dust, current status, and future prospects.

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