HAW09-2009-000863

Abstract for an Invited Paper
for the HAW09 Meeting of
the American Physical Society

Constraints on Nuclear Astrophysics from Presolar Stardust in Meteorites

LARRY NITTLER, Carnegie Institution of Washington

Meteorites contain presolar grains of stardust, solid condensates from previous generations of stars that survived destructive processes in interstellar space and the early solar system and can now be studied in detail in the laboratory. They are identified on the basis of extremely unusual isotopic compositions, which directly reflect nuclear processes in their parent stars as well as Galactic Chemical Evolution. They thus can provide important information for nuclear astrophysics, complementary to astronomical observations, but in many cases with much higher analytical precision. A large number of types of presolar grains, including elemental C and various carbides, oxides and silicates have now been identified. Based on comparisons with astronomical observations and theoretical models, a diversity of stellar sources has been identified for the grains including AGB stars, supernovae, and novae. The grain isotopic compositions have provided a wealth of new constraints on nuclear processes in these environments as well as on stellar and galactic evolution. This talk will review the current status of presolar grain studies as they apply to nuclear astrophysics.