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Laboratory Experiments on Cosmic Dust

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Cosmic dust grains are present in nearly all astrophysical environments proving their existence by the absorption, scattering, and reemission of stellar light in a broad spectral range covering wavelengths from the UV up to millimeters. Dedicated laboratory experiments are necessary to get more insight into the formation pathways and chemical modification of refractory solids under different astrophysical conditions. Such experiments include the formation of dust at varying temperatures and densities and the processing of grains due to a bombardment with ions, atoms, and UV photons. All these studies have to be complemented by a detailed analytical characterization of the final products. The measurements of the spectral properties of dust at different evolutionary states in the laboratory provide a major link to the astronomical observations and the tool for identification of cosmic dust components. In addition, it helps to restrict the conditions in the corresponding astrophysical environments. Our insight into the structural and
spectral properties of cosmic dust in different astrophysical environments such as circumstellar shells, the diffuse and dense interstellar medium, and disks around young stars has been significantly improved by the laboratory studies in the last years. This review describes the recent progress in understanding the formation, processing, morphology, and composition of main dust components including siliceous and carbonaceous grains.

Consider for a poster?

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Session Classification: Laboratory studies of cosmic dust

Track Classification: What is dust?