

Virginia Tech, Naval Research Lab co-host international workshop on dusty plasma physics

June 19 2006

Most of the universe exists in a state called "dusty plasma". In the solar system, dusty plasma forms with the interaction of dust particles with gases and may appear as tails of comets or as planetary rings.

A community of scientists and engineers are now devoted to the study of dusty plasma, and many of these world experts will soon converge in Colonial Williamsburg, Va., to discuss their theories and findings at the 11th Workshop on the Physics of Dusty Plasma Physics. Virginia Tech and the US Naval Research Laboratory (NRL) are co-hosting the event June 28 through July 1.

"When dust is immersed in ionized gas or so-called plasma, it becomes electrically charged with as little as one or two elementary charges up to as many as tens of thousands of elementary charges," explained Wayne Scales, professor of electrical and computer engineering (ECE), and co-organizer of the conference.

"It is the fact that the dust is charged that makes the physical behavior of these systems so physically complex and fascinating," Scales added.

"This field is truly unique since it is a blend of basic science and engineering and has a broad spectrum of novel technology applications."

A key example is the microchip industry where corporations have incurred great expense to develop clean rooms and thus avoid dust

particles contaminating the manufacturing process.

Dusty plasma is ubiquitous since 99 percent of the universe exists in such a state. The charged dust can range in size from nanometers to several hundred microns in diameter and the associated dust clouds can range from a few millimeters in laboratory applications to millions of kilometers for astrophysical applications. Early investigations in the field provided explanations of spectacular structures in the rings of Saturn made by deep space probes.

During the past 15 years tremendous growth has occurred in the field with applications to nanotechnology, plasma processing, material science, condensed matter physics, atmospheric physics, as well as planetary science and astrophysics. In recent years, dusty plasmas have also been studied under microgravity conditions using parabolic flights, sounding rockets, and the International Space Station to assess the effects of gravity on systems containing relatively large dust particles for potential novel technology applications.

Source: Virginia Tech

Citation: Virginia Tech, Naval Research Lab co-host international workshop on dusty plasma physics (2006, June 19) retrieved 9 April 2024 from <https://phys.org/news/2006-06-virginia-tech-naval-lab-co-host.html>

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