Australian Institute of Physics (SA branch)

http://www.physics.adelaide.edu.au/aip-sa

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AIP STUDENT NIGHT

at 7:30pm, Tuesday August 10th 1999
in the Kerr Grant Lecture Theatre
Physics Building, The University of Adelaide

The 1998 Silver Bragg medals, awarded for highest achievement in the final undergraduate year of a Physics degree, will be presented. Andrew Meyer, who received some support from the AIP to represent Australia at the National Youth Science Week in South Africa, will talk about how the National Youth Science Forum has helped him. Three Postgraduate students, one from each SA University will give a talk on their research work, as detailed below:

"Electrokinetic Phenomena in a Non-Polar Colloidal System"

by Suparno

of the *School of Physics and Electronic Systems Engineering, The University of South Australia*

Phase Analysis Light Scattering (PALS) and Atomic Force Microscopy (AFM) have been used to study the electrokinetic phenomena of a colloidal system consisting of CN-terminated silica particles suspended in Isopar M in the presence of the surfactant AOT. The effect of AOT concentration on the mobility of the particles is reported. Furthermore, the electric field dependence of the mobility was measured using the PALS system. Finally, complementary force-distance measurements using an AFM of CN-Silica in Isopar M are presented.

"Experimental Observations of Coulomb Crystals"

by Nathan J. Prior

of the *Department of Physics, Flinders University of South Australia*

Small particles introduced into a plasma obtain negative charges due to high numbers of collisions with electrons. Under the correct plasma conditions these highly charged particles can levitate and form a macroscopic crystal lattice, known as a Coulomb crystal. The properties of these Coulomb crystals have created much interest in the plasma field recently with many experiments ranging from investigations of the structure of such crystals, their melting transitions and the application of various electromagnetic fields to small crystals. For the experiments at Flinders University the particles are polymer spheres with a diameter of six microns, levitating in a low density argon plasma. The main area of interest is the application of different electromagnetic fields to the structures and observation of the crystal's behaviour. This talk will give a brief introduction to the field of dusty plasmas and an overview of the experiments at Flinders University.

"Calculating the Mass of the Proton"

by Stewart Wright

of the *Dept. of Physics and Mathematical Physics, The University of Adelaide*

Quantum Chromodynamics (QCD) is believed to describe how quarks and gluons interact and form protons, neutrons and the majority of the matter in the universe. However the only way we can actually calculate the properties of QCD is by putting the theory on a space-time lattice and using years of supercomputer time. Still the masses of the quarks used in these supercomputer simulations are too heavy, largely due to the increased computational demands of light quarks. The method that I will present to overcome this difficulty uses physical insights to take the lattice QCD calculations to the real world.