Physics Colloquium

Michigan Technological University

Thursday, October 27, 2011 at 4:00 pm

Room 139 Fisher Hall

The Physics of Atmospheric Ice Nucleation

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Abstract: Determination of the ability of aerosols to facilitate the freezing of ice crystals in cold clouds is complicated by the complex and changing structure of soot particles in the atmosphere. Here the heterogeneous freezing temperatures of droplets in contact with fresh and oxidized particles composed of soot and polyaromatic hydrocarbons were determined. Mean freezing temperatures in which fresh particles were tested as ice nuclei ranged from -19 to -24 °C, depending on the composition. In all cases, our result showed that exposure to ozone facilitates ice nucleation at significantly warmer temperatures, ~3 °C, than on fresh particles. Classical nucleation theory is used to derive heterogeneous nucleation rates and the probability of freezing as a function of temperature for each type of ice nucleus studied in this experiment.

Biography: Dr. Sarah Brooks received her B.S. in Chemistry from Massachusetts Institute of Technology in 1995 and went on to earn her Ph.D. in Analytical Chemistry from the University of Colorado, Boulder, in 2002. She is currently an associate professor in the Department of Atmospheric Sciences at Texas A&M University. Sarah's research group conducts field and laboratory measurements on aerosol chemistry and physics, warm and ice cloud nucleation, and air quality. She received the PECASE Presidential Early Career Award in Science and Engineering Award in 2007 and a National Science Foundation CAREER Award in 2006.

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