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Structural studies of mixed lipid bilayers on solid substrates using x-ray reflectivity GANG CHEN, MRINMAY MUKHOPADHYAY, YICONG MA, SUNIL SINHA, Department of Physics, University of California, San Diego, ZHANG JIANG, Advanced Photon Source, Argonne National Laboratory, CURT DECARO, JUSTIN BERRY, LAURENCE LURIO, Department of Physics, Northern Illinois University, ADRIAN BROZELL, ATUL PARIKH, Departments of Applied Science and Biophysics Graduate Group, University of California, Davis — The lipid bilayers of natural membranes generally exist in a fluid state which occurs above the gel to liquid crystalline phase transition temperature. Knowledge of the structure of such bilayers is important for understanding fundamental biological processes mediated by or occurring within membranes. We have performed systematic measurements on bilayers of 1,2-Dipalmitoyl-*sn*-Glycero-3-Phosphoethanolamine (DPPE) and its mixture with 1,2-Dioleoyl-*sn*-Glycero-3-Phosphocholine (DOPC) and cholesterol (CH) on silicon substrates with x-ray reflectivity both below and above their phase transition temperatures. Structural variations as a function of temperature are demonstrated by fitting the reflectivity data with both a model dependent and a model independent routine. Studies of Au nanoparticle labeled DOPC and DOPC + DPPE + CH mixture are also performed and the location of Au nanoparticles in these bilayers is established by analyzing the x-ray reflectivity data.

Gang Chen
Department of Physics, University of California, San Diego

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