SACRAMENTO STATE

Department of Physics & Astronomy Fall 2006

Physics Colloquium Series
~ Summer Student Research Talks ~

The optimal particle collection efficiency of a prototype environmental tobacco smoke (ETS) sampler based on the use of thermophoresis was determined with a particle phase "titration" in a 24 m^3 environmental chamber. This sampler's heating element was made of three sets of thermophoretic (TP) wires of 25 µm in diameter suspended across a channel cut in a printed circuit board. Two collecting surfaces were mounted, one on each side, to form a flow channel of 1 mm high with the TP wires suspended in the middle, 500 µm from each surface. The separation of between the heating element and the room temperature collection surface was determined in a numerical simulation based on Brock-Talbot model. Other thermal parameters of this TP ETS sampler were predicted by the Brock-Talbot model for TP deposition. The theoretical thermal parameters were examined and were used to characterize the TP ETS sampler's collection mechanism. In addition, by heating the wires we determined their temperature-resistance relationship. From the normalized results the optimal collection ratio was expressed in terms of applied voltage and filter mass. We raised the operational voltage from 1.0 to 3.0 V, and we found that the collection efficiency was increased by a factor of five for both theory and experiment.

Zhuo Huang

We tested an upgrade plan for the Bunch Current Monitors (BCM) in the PEP II storage rings at the Stanford Linear Accelerator Center (SLAC). We tested the prototype system (Gproto) by connecting it in parallel with the current system to validate the method. The BCMs in the PEP II storage rings need to be upgraded because components of the original system have failed and are known to be failure prone with age, and several of the integrated chips are no longer produced making repairs difficult if not impossible.

Joshua Kline

Thursday, September 14, 2006
4:00-5:20 PM MND 1015

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