ELECTROSTATIC CONTROL OF HELIUM TIDES IN THE STEP CRYOSTAT

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It is proposed to control the gravity-gradient-induced motions of the liquid helium cryogen in the STEP cryostat by an electrostatic system. The system will use the forces generated by convergent electrostatic fields to reduce the motion of the helium to an acceptable value. Forces of the order 0.001 g can be generated by applications of voltages in the range of 1000 to 10,000 volts.

The electrostatic system is being verified by a combination of analysis and experiment. Analytic and computer-based models have shown that the necessary forces can be developed. Study of miniature versions of several proposed electrode configurations in a zero-g environment have demonstrated that control can be achieved. The experiment also demonstrated that the necessary *electric* fields could be achieved without electrical arcing in the helium gas.

This paper will report on the progress to date on the analysis and experimental test of the electrostatic system. The presentation will include video tapes of the behavior of helium in zero gravity.

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