# The Progress of the Cryogenic Nitrogen Pulsating Heat Pipes with Varying Number of Turns

*Z. Jiang, J. Pfotenhauer, F. Miller, Univ. of Wisconsin-Madison, Madison WI.*

Pulsating heat pipes (PHP) is a simple passive heat transfer device that can drastically reduce heat loss compared with a traditional thermal busbar when a cryocooler is in a remote location. The reliability and lifespan of the cryocooler can be improved when a PHP is installed as a thermal switch. This paper shares the progress of a study of a nitrogen-based pulsating heat pipe with the number of turns varying from 1 to 3 to 5 to 7 to optimize the number of turns of the cryogenic nitrogen-based pulsating heat pipe. There are two near-identical PHP subsections in which the length of condenser, adiabatic, and evaporator sections are 90mm, 1000mm, and 60mm respectively. At each configuration, the PHP assembly is tested at the normal boiling point of nitrogen (77.3K) and 84.5K with initial fill ratios of 50%, 63%, and 75%. The thermal performance of the PHP will be analyzed with respect to the heat load per turn among all the configurations and the associated values of effective thermal conductivity.