Thermophysical Properties of a Cryogenic Pulsating Heat Pipe

Dan Grant

The purpose of this research is to develop an experimental model of the behavior of a pulsating heat pipe (PHP) using cryogenic fluids as the working media. Specifically, we will be using liquid helium in a PHP to test its suitability to remove a simulated heating load for a magnetic resonance imaging (MRI) chamber. We will explore certain key parameters, including geometrical factors (inner tube diameter, length of heating/cooling sections, and number of turns), operating parameters (gravitational effects, filling ratio, and heating load) and thermophysical properties to establish a non-dimensional equation to predict heat transfer capabilities of a cryogenic PHP. Using this equation, others can perform further research into the viability of using cryogenic fluids in PHPs for various purposes.