

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Science Results from Ground Based Research (4)Author: Ms. Li Zhang
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National Microgravity Laboratory, Institute of Mechanics, Chinese Academy of Sciences., ChinaEXPERIMENTAL STUDY ON SURFACE TEMPERATURE OSCILLATION MODES FOR THIN
FLUID LAYERS IN AN OPEN ANNULAR POOL**Abstract**

A sensitivity of 0.05 infrared camera is used in our work to capture the surface temperature oscillation of thin fluid layers ($Pr=16,25,28$) in an open annular pool which is heated from inside. Seven kinds of azimuthal oscillatory modes are observed as well as a hydrothermal wave mode. The azimuthal wave number $m=0$ oscillation mode (referred to as $m=0$) is basically found as the first transition state under various conditions and its critical temperature differences raise gradually with Pr number for the test fluid. When the temperature difference increase, $m=0,6,7$ act as the dominant oscillation modes for 1.5cSt and 2cSt silicone oil while modes change frequently for 1cSt silicone oil. Further analysis show for 1cSt silicone oil, when $Bo>0.3$, oscillatory flow will occur but when $Bo<0.25$, that will be hydrothermal wave. Additionally, if $3500<Ma<10000$, there will be much more possibility for $m=6$ to show up.