

***The Development of an Active Magnetic  
Regenerative Refrigerator (AMRR)  
For sub-Kelvin Cooling of  
Space Science Instrumentation***

*C.M. Gunderson, G.F. Nellis, F.K. Miller, Univ. of Wisconsin -  
Madison, Madison, WI*

Sub-Kelvin operating temperatures are required for a wide range of space science instrumentation. Consistent and reliable cooling of these instruments is critical in order to ensure top performance in high sensitivity applications. This research works towards the development of a sub-Kelvin Active Magnetic Regenerative Refrigeration (AMRR) system that can provide distributed cooling to space instrumentation via circulation of a  $3\text{He}$ - $4\text{He}$  mixture. A Superfluid Magnetic Pump (SMP) is used to circulate superfluid  $3\text{He}$ - $4\text{He}$  mixture throughout the rest of the system, which consists of two hot heat exchangers, one cold heat exchanger, and two magnetic regenerators. This presentation will discuss the design and experimental results from early testing of a proof-of-concept AMRR.