

## DEVELOPMENT OF THE DYNAMX FLIGHT INSTRUMENT PROTOTYPE

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We report on the design, fabrication, and ground testing of a prototype flight sample subsystem for the Critical Dynamics in Microgravity Experiment (DYNAMX), an experiment scheduled to fly on the space shuttle as part of the Microgravity Science Payload (MSP) in early calendar 2002.

The prototype subsystem allows measurements of the heat transport properties of liquid helium at the superfluid/normal fluid transition within an orbiting cryostat to be conducted with  $10^{-10}$  K thermal,  $10^{-5}$  m spatial and  $10^{-10}$  W heat flow order of magnitude resolution. These levels of requirements, however, have not previously been simultaneously met by any flight qualified cryogenic apparatus, and the current challenge is to meet all requirements within the inherited experiment configuration to the degree possible.

The design requirements, the resultant design for this prototype subsystem as well as the implementation experiences will be presented. This will include the thermal and structural design analysis, as well as the results of ground based operational and environmental testing

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