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C4Or1A-05: Modifications to the MIRI Cryocooler design to provide significant lift in the 2K to 4K range

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A high Technology Readiness Level cryocooler with significant cooling in the 2K to 4K regime will enable a variety of missions ranging from large infrared space telescopes to superconducting and quantum applications. The cryocooler for the MIRI instrument on JWST was designed for operation at 6K, and with relatively minor changes this design can achieve significant lift in the 2K to 4K region. This paper provides curves of predicted lift vs power for a variety of operating temperatures, based on the model anchored by tests of the MIRI cooler. The modifications are described, and their mass impacts are estimated. These mass and performance estimates enable payload and mission planners to explore new mission classes.

Primary authors: PETACH, Michael (Northrop Grumman Aerospace Systems); NGUYEN, Tanh (Northrop Grumman Aerospace Systems); MICHAELIAN, Mark (Northrop Grumman Aerospace Systems)

Presenter: PETACH, Michael (Northrop Grumman Aerospace Systems)

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