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C3Or2B-04: Performance Testing of the 4kW ESR 2 Refrigerator at JLab

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The End Station Refrigerator 2 (ESR2) is the eventual replacement for the ESR1. ESR2 is a refurbished cryoplant comprised of the cold box and compressors of the 4 kW at 4.5K ASST-A plant from the Superconducting Super Collider in Texas. Additionally, ESR2 is equipped with a 10 m3 liquid helium Dewar, cryogenic distribution system including more than 50m long cold transfer line, control system, utility system. ESR2 cryoplant was repurposed to produce cold helium supply at 15K, 12K and 8K temperatures for the experimental hall target loads. The MOLLER target is the most demanding, 5kW equivalent at 15K temperature target load for the ESR2. This paper reports the commissioning results of the 4.5K refrigeration system at max refrigeration, max liquefaction, and 50/50 at both 100% and 50% capacity modes; the expected MOLLER load, and compares the current performance with past commissioning performance for the cold box when it was part of the ASST-A plant.

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