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C2Po1A-03: Cryogenic plant integration for the Colossus milli-Kelvin platform at Fermilab

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The Colossus platform at Fermilab will be the largest and most powerful 3He/4He dilution-cooled cryogenic system constructed to-date. Perhaps its primary innovation will be in the integration of a liquid helium cryogenics plant to cool the stages typically cooled by mechanical cryocoolers in commercially available cryogen-free dilution refrigerators. This design shift carries with it important implications for the future of cryogenics associated with quantum computing due to the inherently greater efficiencies of helium cryogenic plants when compared to the use of multitude of independent mechanical cryocoolers. Construction of Colossus is expected to begin in 2023 with a target of commencing operations in 2025.

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