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Design of the Fermilab Pre-Series Cold Mass for the HL-LHC Accelerator Upgrade Project

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As part of the U.S. contribution to the HL-LHC Accelerator Upgrade Project (AUP), Fermilab is designing and building cold masses suitable for use in the LHC interaction regions. The cold mass provides a vacuum-tight helium enclosure for the magnets. Two magnets are aligned both axially and in cross section at Fermilab based on survey and warm magnetic measurements. Bus work and instrumentation is added. A welded stainless steel vacuum-tight shell surrounds the two magnets, and the structure is prepared for insertion into the cryostat. This paper summarizes the design of the cold mass including alignment, bus work, weld details, and instrumentation.

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