

eeFACT 2025 - 70th ICFA Advanced Beam Dynamics Workshop on High Luminosity Circular e+e-Colliders



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Cryogenics system for ILC

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The International Linear Collider (ILC) is a large accelerator project using many superconducting cavities and magnets. Therefore, huge cryogenic systems are required. The early design of the ILC was published as the Technical Design Report (TDR) in 2013, however, some changes have been accepted since then. The biggest change is that the collision energy was decreased from 500 GeV to 250 GeV at the start of operations. Even the ILC, with a center of mass energy of 250 GeV, has a total length of 20 km. There are several variations in the ILC proposal, but if the accelerator is built in a mountainous region, the main linac would consist of six superconducting linacs, each approximately 2.5 km long, and to cool them, six helium refrigerators, with a cooling capacity of approximately 19 kW at 4.5 K, would be constructed. The refrigeration equipment is operated by connecting a compressor constructed on the ground to a cold box installed in the tunnel with room temperature piping, and the material gas is stored on the ground. In addition, the system is designed to recover helium gas without releasing it into the atmosphere, even during a power outage. And, superconducting equipment will be used for the detectors, focusing coils, damping rings, etc., so smaller-scale refrigerators will be constructed.

Footnotes

Funding Agency

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Yes

Primary author: NAKANISHI, Kota (High Energy Accelerator Research Organization)

Co-authors: NAKAI, Hiroataka (High Energy Accelerator Research Organization); OKAMURA, Takahiro (High Energy Accelerator Research Organization)

Presenter: NAKANISHI, Kota (High Energy Accelerator Research Organization)

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