

High density beam extraction from GaAs/GaAsP superlattice photocathode

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Advanced accelerators as well as International Linear Collider (ILC) and 4th generation light source require high charge ($>6.4\text{nC}$ for ILC), high density ($\sim 10\text{A/mm}^2$ for ERL) electron beam at an electron source. We developed 200keV load-lock gun for demonstration of ILC electron source parameter and examine ERL electron gun parameter.

A GaAs/GaAsP superlattice and a bulk GaAs photocathode were used for ILC/ERL beam demonstration. Using GaAs/GaAsP photocathode, the bunch charge of 8nC was produced at the source in a 1.6ns bunch with a 20 mm diameter laser spot at the photocathode, and 3pC for a 25ps bunch with $\sim 1.6\text{mm}$ diameter respectively.