

Performance of CW superconducting cavity at ERL test facility

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The 35 MeV compact Energy Recovery Linac (cERL) is a test facility of the future 3-GeV ERL project at KEK. At present, the RF system for a buncher cavity and total of 3 injector cavities were constructed. A FPGA-based LLRF system was established to stabilize the RF field. The 0.1% and 0.1° stabilization goals can be achieved by the closed-loop operation. A gain scanning experiment for determining the optimal gains was carried out to improve the performance of the system. Furthermore, main system parameters (i.e. loop delay and bandwidth) were identified by modern system identification method. According to the current closed-loop experiment, The optimal RF stability was 0.01% RMS for amplitude and 0.02° for phase for the injector cavities while the corresponding beam energy stability was 0.006% RMS. In this presentation, we describe the current status and performance of the RF system at cERL.

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