

## ERL PROTOTYPE AT BNL

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### *Abstract*

A prototype ampere-class superconducting energy recovery linac (ERL) is under advanced construction at BNL. Its motivation, design, special features and status will be described. The Collider-Accelerator Department at BNL, which operates RHIC, is planning an electron-ion collider called eRHIC. The eRHIC electron beam will be provided by a multi-pass superconducting ERL. At the highest energy and luminosity, eRHIC will have 5 passes at 260 mA, whereas an intermediate version of eRHIC (called MeRHIC) will have 3 passes at 50 mA. To test the feasibility of such an ampere-class ERL we are constructing a prototype ERL designed to operate at up to 500 mA average current. The BNL R&D ERL will serve as a test bed for eRHIC. It will operate at 703.75 MHz. Its special features are an SRF laser photocathode RF gun designed to deliver 2 MeV at 500 mA, a high QE multi-alkaline cathode preparation and load-lock system, an emittance-preserving merging system, and a highly damped 5-cell 20 MeV ERL cavity. Tests at the ERL will include high-current handling, coherent emissions, and emittance performance. The ERL will also serve as a platform to study HOM damping issues.

**CONTRIBUTION NOT  
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