

# **Requirements for Magnetized, Bunched-Beam Cooling**

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## **Abstract**

The JLEIC cooler occupies a unique region of parameter space wherein high charge, magnetized bunches are conditioned in an energy recovery linac (ERL) at relatively low energy (55 MeV) before being transferred to a cooler ring for 11 passes through a long cooling channel (co-propagating with the proton beam) and then transferred back to the ERL. At the cooling solenoid, the electron bunch must maintain a small projected energy spread and therefore must avoid gross distortion due to coherent synchrotron radiation and longitudinal space charge over multiple recirculations. Due to the high charge (3.2 nC) a variety of collective effects – space charge, the microbunching instability and coherent synchrotron radiation, among others – must be managed.