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Gradient Maintenance at Jefferson Lab

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The 12GeV upgrade at Jefferson Lab doubled the energy reach of the lab’s recirculating accelerator. This upgrade was made possible by advances in cryomodule and cavity design improvements that led to higher gradient gain per cryomodule. The upgrade included 10 these new “C100” modules designed to provide 100MeV of acceleration capability plus an additional margin of 10%.
Now that we are operating, cryomodule performance is being limited by field emission, resulting from suspected particulates in the cavity vacuum space. Currently, the cryomodules operate at an average of ˜80% of their nominal value when set to reasonable trip levels. Optimizing gradients to minimize field emissions provides additional challenges. Gradient reach continues to degrade at a statistical rate of 34MeV/pass per year adding additional strain to the energy reach.
A performance plan that involves new and refurbished cryomodules is now underway to mitigate the system issues and restore the accelerator’s energy reach capability. Energy reach optimization efforts and the performance improvement plan will be discussed.

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