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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. To meet the upgrade requirements, ten new C100 style cryomodules were added to the linacs to supply the additional energy reach. Each C100 was designed to provide 100MeV of acceleration capability plus a 10% margin; twice that of 6GeV era cryomodules. Acceptance testing of the first C100 showed that the new cryomodule met the design specification. However, this performance has not been reproduced during production operations with installed cryomodules currently operating at ~80% of their nominal value. Further, the linacs continue to degrade at a rate of 34MeV/pass/year. As a result a "Gradient Team" was formed to understand and mitigate the system performance issues. The team identified several issues including field emissions, microphonics, vacuum cleanliness, trip restoration, and other issues negatively affecting the C100 performance. Three themes were identified to focus improvements on including optimizing gradient, reducing trips, and minimizing recovery time. The categorization, prioritization, and solutions of the identified issues will be discussed.

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