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FFA design study for a high intensity proton driver

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As an option for the proton driver for the next generation spallation neutron source (ISIS-II) at the Rutherford Appleton Laboratory (RAL), a Fixed Field Alternating Gradient Accelerator (FFA) is being considered. A prototype accelerator has been designed, referred to as FETS-FFA, to demonstrate flexible handling of beam repetition for users and high intensity operation with minimum beam loss. FETS-FFA takes the 3 MeV beams from RAL's Front End Test Stand (FETS) linac and accelerates them to 12 MeV. FD spiral optics have been adopted as the basic focusing structure, which allows the operating point to be chosen along the diagonal in tune space. Flexible beam repetition will be demonstrated by RF beam stacking at the extraction energy, which enables users to choose different (lower) repetition rates independent of the acceleration cycle. For high intensity beam study, several schemes of injection painting are being considered. At the injection energy, the space charge tune shift can be easily exceed -0.3. This paper discusses the overall design, while further details of each aspect of the accelerator, including hardware, are presented in separate conference papers.

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Footnotes

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Yes

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