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* **Measurements and Damping of the ISIS Head-Tail Instability**

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ISIS is the pulsed spallation neutron and muon source at the Rutherford Appleton Laboratory in the UK. Operation centres on a rapid cycling proton synchrotron (RCS) which accelerates 3×10^{13} protons per pulse from 70 MeV to 800 MeV at 50 Hz, delivering a mean beam power of 0.2 MW.

Research and development at ISIS are focused on key aspects of high intensity operation with a view to increasing beam intensity on target; understanding loss mechanisms and identifying viable upgrade routes. At present, the main limitation on beam intensity at ISIS is beam losses associated with the head-tail instability. This paper presents new measurements of the head-tail instability in both RCS and storage ring modes whilst highlighting the differences between these and theoretical predictions. Macro-particle simulations of the instability are shown in comparison with experimental data. Finally, preliminary tests of an active transverse feedback system to damp the instability are also presented.

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