

**High Stability Operation of the ISIS Pulsed Spallation Neutron Source at 200  $\mu$ A,**

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Appleton Laboratory, U.K - The ISIS pulsed spallation neutron source now operates with high intensity of 200  $\mu$ A. The tuning of such high intensity accelerators is dominated by the successful control and minimisation of beam losses. It is found that this can lead to a gradual drift in parameter space that limits the synchrotron to a sub-optimal performance. Minimisation of beam loss is critically dependent on the stability of operation of the fast cycling synchrotron, which becomes very sensitive at high intensity, particularly to the intensity and injection conditions. A considerable improvement in stability at 200  $\mu$ A has been obtained by fitting two new servo systems; one controls the ion source current to stabilise injected intensity and the other controls the synchrotron radial beam position before bunching is complete. Tuning the synchrotron at high intensity has been simplified by the development of a multiplexing system that allows one pulse in 128 to operate at a different tune without tripping on beam loss. This permits very fine tuning of the synchrotron whilst operating close to full intensity, before switching all pulses to the new tune once an improvement has been established.