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(G*) POS-C11 – Design and Simulation of Transparent Injection Upgrade for the CLS Storage Ring

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The Canadian Light Source (CLS) synchrotron uses four fast kicker magnets to inject electrons into the storage ring from a 2.9 GeV booster ring. The injection occurs over several turns of the stored beam, which is also perturbed by the injection kickers. The resultant oscillations of the stored beam can negatively affect the quality of beamline experiments, so it is desirable to implement an injection scheme which does not disturb the stored beam. Injection schemes of this type allow for transparent injection and are very desirable for the planned top-up operations of the CLS storage ring. Many alternative injection techniques have been presented in recent years and we have examined several of these techniques as they apply to the CLS storage ring. Pulsed multipole magnets and a non-linear kicker are the most viable alternatives for integration with the current ring. Non-linear kicker designs are also being considered for the proposed CLS 2.0 and studying this injection method in the limitations of the current machine provides additional insight to guide the work on the new machine. Simulation with the accelerator code ELEGANT shows the viability of the non-linear kicker design as developed at BESSY, MAX IV and SOLEIL (other synchrotron facilities) for transparent injection at the CLS.

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