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Simulation study towards a new injector LINAC for the SOLARIS synchrotron facility

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SOLARIS injector LINAC is designed to efficiently fill the electron storage ring. The injection currently takes place at 540 MeV, two times per day. After the accumulation of electron current, the energy is ramped up inside the ring to 1.5 GeV via two active RF cavities.
Top-up injection would be of extreme benefits for user operation, therefore here we present a simulation study for the design of a new injector that would make this possible in the future.
The major constraint for the simulation campaigns has been the space available in the existing LINAC tunnel. The idea is to replace the current machine (or modifying it) without infrastructural interventions in terms of tunnel expansion.
Performed studies demonstrate that the best solution is provided by a Hybrid S-band/C-band LINAC. Simulations have been performed using different codes and results are shown here.
Finally, a new machine working at 1.5 GeV would also pave the way to further diagnostic and/or experimental beamlines for particles and radiation solely based on the LINAC. In particular, one of the main goals is to achieve bunch compression below the picosecond level and low-emittance beams for a future short-pulse facility or a Free Electron Laser.

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Footnotes

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Yes

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