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Achromatic low energy merger for energy recovery linacs

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Nowadays, Energy Recovery Linacs (ERLs) became really appealing thanks to their low environmental impact and high sustainability.

ERLs require a special low energy injector, usually named merger. The energy at merger exit is clearly the energy that can't be recycled in the ERL machine and is the amount dumped at the end. The lower the injection energy is the more efficient is the energy recovery process.

A physiological issue of low energy ERL injection is the presence of space charge in the dispersive section that introduces to dispersion leaks.

Worldwide ad hoc solutions for mergers beamlines design have been studied to address this problem.

Here we present a different approach that allowed us to exploit a standard dogleg to design a very low energy merger for an ERL. This has been made possible thanks to the application of the GIOTTO AI code that optimizes of the optics setting finding a proper achromatic configuration.

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Footnotes

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Yes

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