



Contribution ID: 1877 Contribution code: TUPL135

Type: **Poster Presentation**

## **Beam Dynamics Optimization of an Electron Linac Using the Multi-Objective Genetic Algorithm**

*Tuesday, 9 May 2023 16:30 (2 hours)*

A beam dynamics optimization study of an electron injector linear accelerator including an RF photoinjector gun was performed using MOGA (Multi-Objective Genetic Algorithm). To meet the requirements of electron beam characteristics at the linac end, the optimization goal was to minimize transverse beam emittance and energy spread. The transverse and longitudinal beam sizes were constrained to find Pareto fronts effectively. Parameters to be optimized were the input phases of the RF gun cavity and accelerator column cavity as well as the strength and position of the focusing solenoids. In addition to finding physical optimization parameters, we also investigated hyper-parameters in optimization simulations such as population, offsprings, generations, etc. This paper presents the optimization results of the linac design.

### **Funding Agency**

### **Footnotes**

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Yes

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**Session Classification:** Tuesday Poster Session

**Track Classification:** MC2: Photon Sources and Electron Accelerators: MC2.A08: Linear Accelerators