

Advanced algorithms for linear accelerator design and operation

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In this paper, we investigate the usage of advanced algorithms adapted for optimizing the design and operation of different linear accelerators (LINACs), notably the superconducting linac ALPI at INFN-LNL and the ANTHEM BNCT facility to be constructed at Caserta, Italy. Utilizing various intelligent algorithms and machine learning techniques such as Bayesian optimization, genetic algorithms, particle swarm optimization, and surrogate modeling with artificial neural networks, we aim to enhance the design efficiency, operational reliability and adaptability of linear accelerators. Through simulations and case studies, we demonstrate the effectiveness and practical implications of these algorithms for optimizing LINAC performances across diverse applications.

Footnotes

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Primary author: ONG, Ysabella Cassandra (Istituto Nazionale di Fisica Nucleare)

Co-authors: BELLAN, Luca (Istituto Nazionale di Fisica Nucleare); PISENT, Andrea (Istituto Nazionale di Fisica Nucleare); COMUNIAN, Michele (Istituto Nazionale di Fisica Nucleare); FAGOTTI, Enrico (Istituto Nazionale di Fisica Nucleare); BORTOLATO, Damiano (Istituto Nazionale di Fisica Nucleare); MONTIS, Maurizio (Istituto Nazionale di Fisica Nucleare); GIACCHINI, Mauro (Istituto Nazionale di Fisica Nucleare); CARLETTO, Osvaldo (Istituto Nazionale di Fisica Nucleare)

Presenter: ONG, Ysabella Cassandra (Istituto Nazionale di Fisica Nucleare)

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