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Programmable physical parameter optimization for particle plasma simulations BENJAMIN RAGAN-KELLEY, UC Berkeley Applied Science and Technology, JOHN VERBONCOEUR, Michigan State University Electrical and Computer Engineering, MING-CHIEH LIN, NSSL, Fu Jen Catholic University — We have developed a scheme for interactive and programmable optimization of physical parameters for plasma simulations. The simulation code Object-Oriented Plasma Device 1-D (OOPD1) has been adapted to a Python interface, allowing sophisticated user or program interaction with simulations, and detailed numerical analysis via numpy. Because the analysis/diagnostic interface is the same as the input mechanism (the Python programming language), it is straightforward to optimize simulation parameters based on analysis of previous runs and automate the optimization process using a user-determined scheme and criteria. An example use case of the Child-Langmuir space charge limit in bipolar flow is demonstrated, where the beam current is iterated upon by measuring the relationship of the measured current and the injected current.

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