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# Electron-positron production in extreme fields

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Electron-positron pair production is one of the most important problems in extreme plasma physics. Thanks to the recent advances in laser technology, these can now be created in the lab using the most intense lasers in the world. If all other parameters are equal, more pairs are expected with a higher laser intensity. However, if the total energy of the laser pulse is fixed, there will be a trade-off between the size of the effective interaction volume and the peak intensity. This work will extend analytical scaling laws for pair production in realistic laser-electron beam scattering, previously derived assuming an ideal plane-wave description; it will also propose optimal and innovative solutions for upcoming experiments, as well as investigate applications of quantum algorithms in extreme plasma physics.

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