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Production of electron-positron pairs using ultra-intense lasers and potential applications¹

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When ultra-intense lasers interact with an over-dense plasma they convert a significant fraction of their energy into relativistic superthermal electrons. When such electrons interact with the nuclei of a high-Z target, electron-positron pairs can be copiously produced via the Trident and Bethe-Heitler processes. Numerical simulations have been performed by many groups, and a number of experiments have been attempted, to study the feasibility of these concepts. This talk will review the current status of laser pair production, plans for future experiments and explore the potential applications of such high-density positron sources, from laboratory astrophysics to exciting new technologies.

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