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Laser Particle Acceleration, Radiation and Laser Nuclear Physics

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At the end of last century, a series of breakthroughs were made in the researches of laser-particle acceleration, intense radiation technology and laser-nuclear physics since the great progress of the technology of ultrashort and ultraintense lasers.

When an ultraintense laser pulse interacts with matters, the strong charge-separation field supports completely new mechanisms for minimization of particle accelerators. We studied the mechanisms of the relativistic ion acceleration and found the up-limit of the maximum ion energy and the critical momentum trapped by the phase-stable field. At the same time, the ultrainense x-rays and gamma-rays generated have distinctive advantages. What is even more exciting is that, the combination of ultraintense lasers, the conventional accelerators and nuclear physics will provide a large scientific research platform for laser-nulear physics. LCS at BEPCII is under established to obtained 0.1-100MeV gamma-rays.

The platform is the unprecedented opportunity of laser-nulcear physics and also supplies the advanced energy-tunable monochromatic gamma rays for defense-related science.

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