High Energy Photon Sources with Relativistic Mirrors: Results and Perspectives

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Abstract:

Relativistic flying mirrors in relativistic laser plasmas are thin, dense electron or electron-ion layers accelerated by high-intensity electromagnetic waves to velocities close to the speed of light in the vacuum. The reflection of the electromagnetic wave from the relativistic mirror results in its energy and frequency changing. In the counter-propagation configuration, the frequency of the reflected wave is multiplied by the factor proportional to the squared gamma-factor of the mirror. This scientific area promises the development of sources of ultrashort X-ray pulses in the attosecond range. The expected intensity is expected to reach the level at which the effects predicted by nonlinear quantum electrodynamics start to play a key role.

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