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Laser Absorption in Plasmas: From Nano-Targets to Near-QED Regime

As the laser technology continues its spectacular development, ever higher field intensities and power levels become accessible in laboratories. The ELI project opens new horizons for laser applications in ultra-bright sources of short wavelength radiation. At the same time, the laser pulse quality – like the contrast ratio – is greatly improved so that fine structured targets maintain their structure till the main pulse arrival. This opens new and unexpected possibilities for laser-plasma engineering towards new physics.

In the talk, we consider laser pulse interaction with nano- and micro-structured targets like nano-grass [1-4] in the intensity range 10^{18} - 10^{20} W/cm². At intensities higher than 10^{22} W/cm², the radiation damping force becomes important and can exceed the Lorentz force acting on an electron [2]. The γ -ray emission is then the major channel of laser energy absorption [3,4].

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