MATTER AND TECHNOLOGIES

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Surface High Harmonics using a long focus length

The poster presents very recent results on Surface High Harmonic Generation (SHHG) using the Jeti200 laser system. With an intensity of 4x10^19 W/cm^2 (3.5 J, 25fs, single plasma mirror) the experiment investigated how SHHG could be stabilized and optimized in efficiency and divergence by using a long focal length (f/D =12.5) for future applications.
In general, the harmonics divergence is proportional to the divergence of the focused laser. This leads for small f/D numbres to a fast diverging HHG beam. Moreover, focusing the laser with small f/D number introduces apatial plasma effects on the target, e.g. denting of the plasma surface, that results in spatial denting and spectral shifts in the HHG spectrum. Also it influences the efficiency of the generation process.

We examine the Relativistic Mirror Model harmonic emission efficiency in a multi parametric scan of the pulse duration (GVD), laser energy and spatial intensity distribution. Our findings show a significant effect on the ROM harmonic divergence and efficiency, indicating a new optimum parametric range and new insights for the generation mechanism.

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