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Characterization of optical properties of organic crystals required by high energy THz pulse generation for THz particle accelerators

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In accelerator physics, high energy THz radiation can be used for different purposes e.g. diagnostic, magnetic lenses, acceleration etc. For this purpose, it is needed a reliable source of high energy THz pulse. Between these sources, Optical Rectification by organic crystals has the highest optical conversion efficiency.

We are going to present new broadband measurements, from ultraviolet (36000 cm⁻¹) to THz (50 cm⁻¹), both in Transmittance and Reflectance, for the organic crystals HMQ-TMS and DSTMS. We will show the reconstructed optical properties for both crystals in all the frequencies range. From these data there will be shown new possibilities for high efficiency pumping wavelength in both crystals; it is to note an optimal pumping wavelength for the HMQ-TMS crystal at around 650nm.

Using these data, simulations of the THz produced by Optical Rectification process will be presented for both crystals, showing how it will be possible to optimize the THz generation, to match the needs both in energy and spectra for the new applications in accelerators physics.

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