Terahertz spectroscopy from air plasmas created by two-color femtosecond laser pulses: The ALTESSE project

Terahertz pulses are very popular because of their numerous applications, for example in security. Located between microwaves and optical waves in the electromagnetic spectrum, their spectral domain can now be exploited for molecular spectroscopy using terahertz emission from plasmas formed by femtosecond laser pulses ionizing gases such as air. Downconversion of broadband optical spectra in a plasma produces intense radiation suitable for the detection of suspect materials remotely. The different physical mechanisms involved to create terahertz radiation by laser-matter interaction are reviewed. The new potentialities offered by intense ultrafast lasers allow the acquisition of unique spectral signatures characterizing various materials.

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