

THz studies with accelerator-based sources

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THz spectroscopy is a widely used analytical tool in many fields of science and technology, as solid state physics, materials science, chemistry, biology, medicine, pharmaceuticals, cultural heritage etc.. This is due to its chemical specificity, high penetration, and non-ionising properties. Thanks to the coupling of THz light with electronic, vibrational, and magnetic degrees of freedom, intense THz light can also be employed for nonlinear studies, thereby allowing to achieve control on materials' properties. We discuss in this lecture the basics of linear and non-linear THz spectroscopy and illustrate the opportunities provided by accelerator-based sources of THz light as synchrotrons and free-electron-lasers.