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Title:Prospects for the study of biological systems with high power sources of terahertz radiation

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Abstract:The emergence of intense sources of terahertz radiation based on lasers and electron accelerators has considerable potential for research on biological systems. This perspective gives a brief survey of theoretical work and the results of experiments on biological molecules and more complex biological systems. Evidence is accumulating that terahertz radiation influences biological systems and this needs to be clarified in order to establish safe levels of human exposure to this radiation. The use of strong sources of terahertz radiation may contribute to the resolution of controversies over the mechanism of biological organization. However the potential of these sources will only be realized if they are accompanied by the development of sophisticated pump-probe and multidimensional experimental techniques and by the study of biological systems in the controlled environments necessary for their maintenance and viability.

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Inspec controlled terms:biochemistry - biological effects of radiation - biological techniques - biomembrane transport - DNA - electron accelerators - molecular biophysics - proteins - terahertz waves

Uncontrolled terms:controlled environments - multidimensional experimental techniques - sophisticated pump-probe - complex biological systems - biological molecules - electron accelerators - lasers - terahertz radiation - high power sources

Inspec classification codes:A8780 Biophysical instrumentation and techniques - A8750B Interactions of biosystems with radiations - A8750G Biological effects of ionizing radiations (UV, X-ray, gamma-ray; particle radiation effects) - A8715M Interactions with radiations at the biomolecular level - A8715D Physical chemistry of biomolecular solutions; condensed states - A8720E Natural and artificial biomembranes - A8725D Biological transport; cellular and subcellular transmembrane physics

Treatment:Theoretical or Mathematical (THR); Experimental (EXP)

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