

CONDENSED MATTER PHYSICS SEMINAR

Thursday 22 October at 14:30

Simpkins Lee Seminar Room, Department of Physics

(<https://maps.app.goo.gl/WjG71uLF2D48n85B6>)

High-power ultrafast moves into the Terahertz

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Ultrafast laser-driven broadband Terahertz light sources are nowadays ubiquitous tools in many scientific fields, enabling researchers to control and probe an immense variety of low energy phenomena in condensed matter and other systems. They are also being increasingly deployed in industry for inspection and non destructive testing: THz waves "see through" optically opaque objects, and can provide rich spectroscopic information at a glance. While techniques to generate short, broadband THz pulses using ultrafast laser pulses and nonlinear conversion techniques have seen continuous performance progress in the last few years, their average power has traditionally moved comparatively slowly, which has prevented many of these fields from progressing and reaching their full potential. On the other hand, the increasing availability and enormous performance progress of ultrafast Ytterbium-based lasers providing multi-100-W to kilowatt average-power levels has opened up the area of high average power, laser-driven THz sources: recent results reaching average power levels in the THz domain approaching the watt-level, opening the door to a multiplicity of new and old research areas to be re-visited. We review recent progress in the generation of high-average power THz-pulses, current technological challenges in scaling THz average power, and applications areas that could potentially benefit from these novel sources.