Abstract
A prototype of commercial portable ABCD system was demonstrated. Powered by an external amplified femto-second laser, this system generates intense terahertz pulses by laser-induced air plasma, and detects the time-domain terahertz waveform by Air Breakdown Coherent Detection (THz ABCD) \(^1\). With 100fs laser, this system provides up to 12THz detection range with 1000:1 signal to noise ratio. Both transmission and reflection modes are available in spectroscopy measurements. The whole system can easily be loaded into mobile vehicles. The portable system has been tested in several different working places.

Introduction
Air Breakdown Coherent Detection (ABCD) is a terahertz detection technology by the high order nonlinear effect in ionized gas plasma. Limited by the laser pulse duration, a typical THz ABCD system provides over 10THz bandwidth with 100fs probe laser. The rising demand of broadband THz spectroscopy brought THz ABCD a very promising future in industrial and academic applications. As every newly developed technologies, lots of technical problems need to be solved before bringing it out of the laboratory. Our portable THz ABCD system is the first attempt to the technology industrialization.

Portable THz ABCD System
The portable THz ABCD system prototype is enclosed in a 22 \(\times\) 26 \(\times\) 10 inch aluminum frame. THz pulses are generated by air plasma four wave-mixing technique, and detected by ABCD, which is actually the inverse process of THz generation. Two delay stages are used in the system for common and fast scan mode. With Nanomotion piezo motor delay stage, the system gets up to one waveform per second nearly real time detection.

Conclusion
The performance of a prototype portable THz ABCD TDS system is demonstrated. In spectroscopy, the system provides a spectral range over 10 THz with 100fs amplified laser, and even wider bandwidth with shorter pulse duration lasers. The system is very easy to transport between working places with different lasers. As a prototype, it is not pushed to the technical limit yet. Great potential remains for the improvement in our next generation system.

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