

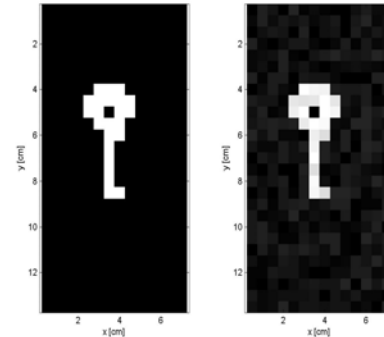
Spectral Ballistic Imaging

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We have developed a new technique, called Spectral Ballistic Imaging (SPEBI), for imaging through optical scattering media. In the past, ballistic imaging has been carried out in the temporal domain in order to extract the information from the first arriving light. SPEBI is essentially an affordable emulation of ballistic imaging, carried out in the frequency domain.

Parameter	Time gating	SPEBI
Temporal Resolution	> 10ps	< 1ps
Acquisition time	Scanning-rate limited	Scanning-rate limited
Cost	Expensive due to pulsed laser and fast electronics and detector	Inexpensive - Based upon optical sources and detectors developed for optical communications
Field-Deployment	Difficult for picosecond resolution	Deployable with sub-picosecond resolution

Based on this technique, we develop a system for applications in homeland security, among them detection of hidden weapons, imaging through fog and smoke, and imaging under water.



- The SPEBI technique is equivalent in terms of resolution to the time-gating or OCT methods, but does not require complicated and expensive equipment.
- The spectral response of the medium $H(\omega)$ is measured directly: both amplitude and phase.
- Sub-picosecond resolution achieved.
- Non-hazardous radiation employed.

