

Company: **Tong Labs**
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Sponsor: **Knobbe Martens Olson & Bear**
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Tong Labs is a defense company that has developed portable isotope detectors for dirty bombs and improvised nuclear devices. This detection system provides compact standoff-capable high-resolution detectors that offer excellent detection sensitivity levels and isotope-specific chemical information. Using sub-Doppler nonlinear wave-mixing laser methods, this technology offers parts-per-quadrillion-level sensitivity for detection of stable and radioactive isotopes in convenient atomizers including graphite furnaces, dc discharges and inductively coupled plasmas.

Using this technology, the high-resolution hyperfine fingerprint profiles of different isotopes can be collected and isotope-ratios calculated by matching measured hyperfine profiles to calculated hyperfine profiles based on the nonlinear optical coherence theory. Since no two hyperfine structures are identical, these portable detectors offer "unambiguous" isotope and chemical measurements. This technology offers better specificity and sensitivity levels than those of expensive commercially available isotope-capable detectors and other conventional radiation detectors based on Geiger counters. In addition, these detectors have standoff detection capability with minimum false positive and negative results, and use a quadratic dependence on concentration, allowing for more dramatic monitoring of small changes in chemical and nuclear properties.