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Highly sensitive NQR/NMR technique for explosive detection (ref. 982836)

Researchers from Turkey and Russia have cooperated since April 2010 to develop novel quadrupole resonance (NQR) and low-field nuclear magnetic resonance (NMR) techniques that provide the highest detection sensitivity in the detection of the explosive compounds. It is well known that most of the explosive and narcotic substances contain nitrogen in their structure. The NQR frequency spectrum is a kind of “passport” of chemical compound. Therefore, NQR on ^{14}N nuclei is very promising methods for their detection. However, low sensitivity of NQR/NMR even using the pulse technique is still very actual problem, and therefore novel sensors will be tested to increase sensitivity of the NQR detection. On the other hand, NQR technique can not be applied in the case of liquid substances. However they can be successfully detected by NMR technique. Taking into account restriction on application of high magnetic field to scan the luggage and people, only low-field NMR (with frequencies which are close to those of NQR on ^{14}N nuclei) can be applied. In the coming months, pure NQR experiments for explosives other than RDX are planned, as well as NQR/NMR double resonance studies in a weak magnetic field. In terms of implementation of the results, it is anticipated that models of equipment for the detection of different nitrogen compounds and explosives will be proposed and designed.

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Web site: www.nqrdetection.ru