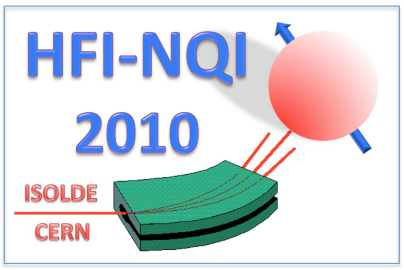

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14N Nuclear Quadrupole Resonance of TNT

Summary

Nuclear Quadrupole Resonance (NQR) is one of the promising techniques for drugs and explosives detection in security applications. Another field emerging very recently is the development of fast methods to nondestructively determine counterfeit drugs. NQR's main advantage over most techniques is specificity, as the sample NQR frequency is almost unique, defined only by the quadrupole moment of the nucleus under observation and the sample specific electric field gradients. Unfortunately, the technique sensitivity is often low, requiring long experiemntal times. This is especially true for a very desirable nucleus 14N. Here I present three techniques used to increase 14N sensitivity which were applied to the detection of the explosive TNT:
 polarization transfer from 1H to 14N [1]
 the use of multipulse sequence spin-lock spin-echo [2], and
 the super-Q detection [3].
Whereas these techniques are very well known in the NMR/NQR community, they present some pecuiliarities when applied to TNT which are related to the occurence of several closely spaced resonance lines.

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