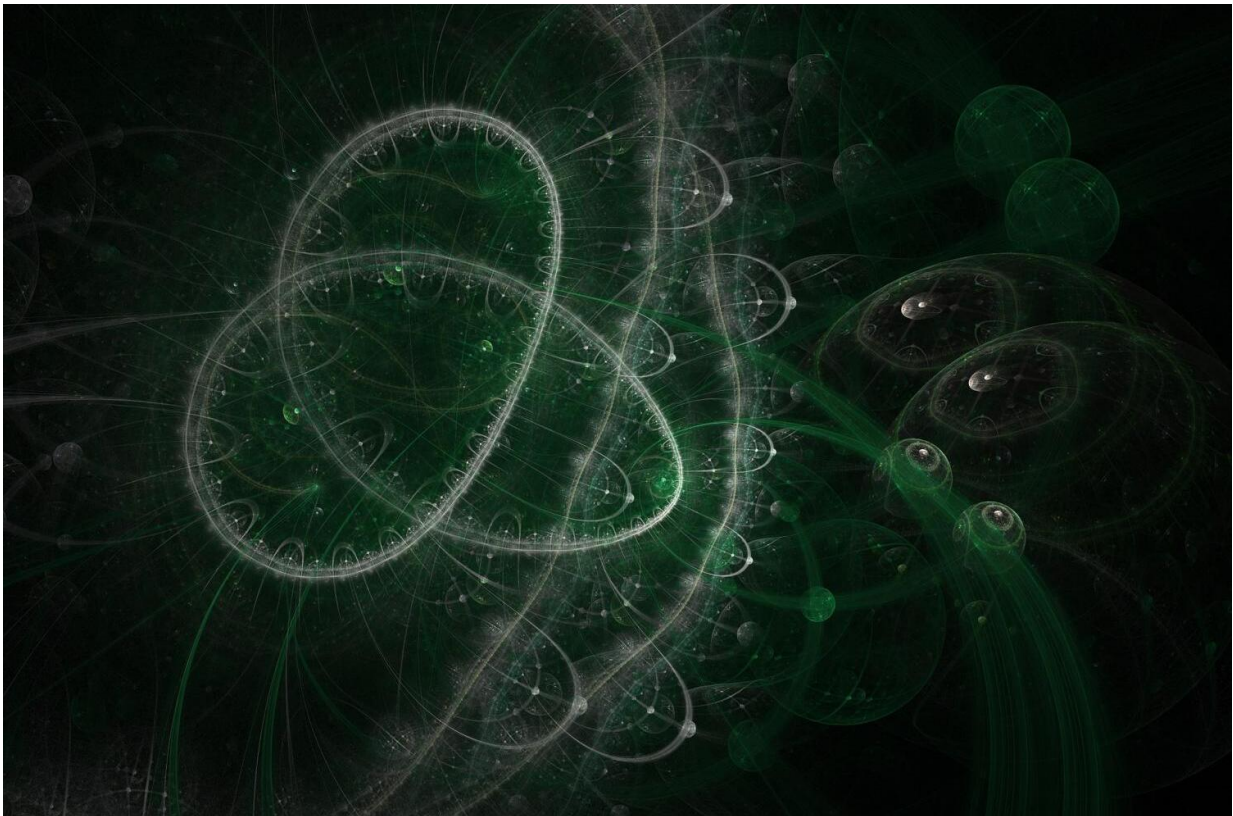


Researchers develop proof of concept for a handheld chemical scanner

March 8 2017, by Bob Yirka



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An international team of researchers has developed a proof of concept for a working hand-held chemical scanner. In their paper published in the journal *Nano Letters*, the team describes their ideas and their belief

that they will have a working model within five years and a device for sale within 10.

Science fiction has featured characters wielding hand-held chemical scanning devices for years, but in the real world, that has hardly been the case—mass spectrometers and MRI machines are big and bulky, and not likely to be carted into the field for on-the-spot testing. But that may change over the next few years as the researchers with this new effort describe plans for a scanner small enough to be carried in the hand—a diamond-based quantum device that borrows technology from atomic clocks and gravitational wave detectors.

To create their device, they are looking at ways to take advantage of the development of nanomechanical sensors and quantum nanosensors—they describe the mass spectrometry part of their device as making use of the mass changes that occur when a molecule attaches to a diamond defect. Creating the rest of the device, they report, involves surveying current devices and then looking at ways of miniaturizing them to the point that they can be included on one or a small number of chips.

To that end, they have outlined principles for implementing nanomechanical sensing using nanospin-mechanical sensors in such a device and have also been assessing the potential for [mass spectrometry](#) and force microscopy in an extremely small space, compared to those that exist today. Such a device, they suggest, could be easily commercialized. They are now at the stage of building a prototype.

The team describes their future device as a tool for use by people in laboratories who do not have the funds to buy today's bulky machines. They suggest it could also prove useful to environmental researchers in the field. The device would have biosecurity applications and as a chemical scanner that could be used by doctors to perform tests on

patients in their comfort of their office. It would provide analytical power at the nanoscale, they claim, in ways that have never been seen before.

More information: Michael S. J. Barson et al. Nanomechanical Sensing Using Spins in Diamond, *Nano Letters* (2017). [DOI: 10.1021/acs.nanolett.6b04544](https://doi.org/10.1021/acs.nanolett.6b04544)

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