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Title: Chip scale quantum sensors for ultra-weak magnetic field measurement:from brain magnetic field imaging to ultra-low field NMR

Abstract:

The quantum sensors own the properties of ultra-sensitive. They could be applied in some new measurement such as brain's magnetic field. The current quantum sensors are table top which is on an optical table. The sensors are quite large and this has limited the application of such sensitive devices. With the combination of microfabrication technique and quantum sensors, we could fabricate chip-scale quantum sensors. For the frontiers of the quantum technologies' application, we will show the chip-scale atomic magnetometers whose sensitivity could reach 1fT. This could enforce the application of the magnetometer for brain's magnetic field measurement as well as ultra-low field nuclear magnetic resonance. In this talk, we will talk the current technique of quantum sensors and their future applications.

Biography:

Yao Chen is now associate professor of School of Instrument Science and Technology, Xi'an Jiaotong University. Due to the ultra-sensitive and ultra-precision properties of quantum sensors, they may be used for various new applications. Yao Chen is focus on chip scale quantum sensors which may be applied in several area such as ultra-sensitive brain's magnetic field sensing, ultra low field NMR for molecular analysis and low drift quantum gyroscope. He is also study trapped ions which could form a quantum oscillator. The quantum oscillator could measure ultra-weak force in the range of $10E-24N$. Yao Chen got the B.S degree and PhD degree from Beihang University. He also had a Post-Doc research experience in Physics Department of Harvard University.