

Quantum technologies at ONERA for AeroSpace and Defense applications

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The second quantum revolution is expected to bring new technologies based on the individual control of elementary quantum systems and their collective properties such as entanglement. In this talk, I will give an overview of the recent developments at ONERA related to the second quantum revolution for AeroSpace and Defense applications, which are organized, within the recently inaugurated QTech Lab, along four scientific axes: quantum calculation, quantum optronics, quantum communications and atomic quantum sensors.

In a second part of this talk, I will focus on the specific example of microwave field sensors based on Rydberg atoms. When promoted to highly-excited states (also known as Rydberg states), neutral atoms can acquire a strong electric dipole making them very sensitive to ambient electromagnetic fields. This could result in a new class of operational sensors with some advantages over state-of-the-art conventional sensors based on conducting antennas that I will discuss during the presentation. I will also present the ongoing work at ONERA in this direction.