QUANTUM EDUKIT: AN EXPERIMENTAL TOOLKIT TO LEARN QUANTUM MECHANICS

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With the advancements in quantum technologies, it is essential that the basic understanding of quantum mechanics reaches students, the general public and policy makers in an intuitive way.

We have developed Quantum Edukit (weblink), an educational kit based on NitrogenVacancy (NV) centers to teach quantum mechanics in a hands-on and interactive manner. The kit enables exploration of principles such as level quantization, quantum superposition, lightmatter interaction and quantum optical effects in real time. Sample experiments include observation of the Zeeman effect, Rabi oscillations, Ramsey interferometry, and spin echo. Moreover, Quantum Edukit demonstrates how these principles underpin real-world applications including quantum magnetometry, atomic clocks, and qubit manipulation. On an experimental level, students gain hands-on experience in building optical setups, optimizing the performance of quantum systems, and acquiring hand-on skills used in quantum research labs.

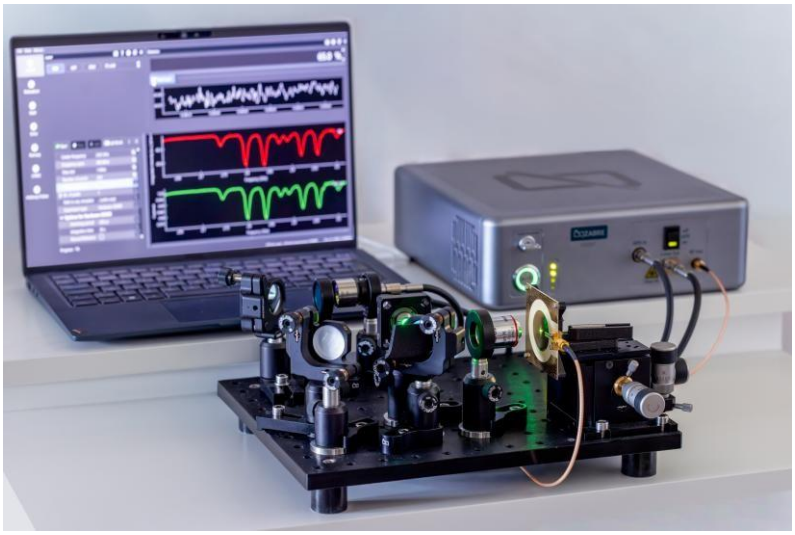

Figure 1: Quantum Edukit

The kit comprises an optical setup, an electronics setup, and custom software, see Figure 1. Optimized for portability and live data visualization, it is ideal for lecture demonstrations and gives students an opportunity to play with the system and observe its real-time response.

By making quantum systems more accessible through a compact and versatile platform, Quantum Edukit aims to deepen students' understanding of quantum mechanics and enhance their engagement with quantum technologies.