Building the second quantum revolution

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In 1952, Erwin Schrödinger wrote in The British Journal for the Philosophy of Science:

“One never realizes experiments with a single electron or an atom or a small molecule. In thought experiments, one assumes that sometimes this is possible; invariably, this leads to ridiculous consequences… One may say that one does not realize experiments with single particles, more than one raises ichthyosaurs in the zoo.”

Among the “ridiculous consequences” of today’s ability to experiment with single particles there are many potential and a few already available applications of quantum physics to various fields of technology, including computation, simulation, communication, sensing and metrology.

Several public and private research organisations worldwide are increasing their investment to improve existing applications and explore new ones. The talk will focus on the recently started European Flagship initiative on quantum technologies, outline its structure as well as its current and upcoming phases.

I will conclude by reporting on a recent result we obtained in the context of optimal control of many-body systems, with the creation the largest GHZ state to date.