

QUANTUM SYSTEMS AS GRAVITATIONAL SOURCES: WHICH QUANTUM ASPECTS OF GRAVITY CAN WE TEST?

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Aula B (piano terra), via della Vasca Navale 84 & TEAMS

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Understanding the fundamental nature of gravity at the interface with quantum theory is a major open question in theoretical physics. Recently, the study of gravitating quantum systems, for instance a massive quantum system prepared in a quantum superposition of positions and sourcing a gravitational field, has attracted a lot of attention: experiments are working towards realising such a scenario in the laboratory, and measuring the gravitational field associated to a quantum source is expected to give some information about quantum aspects of gravity. However, there are still open questions concerning the precise conclusions that these experiments could draw on the nature of gravity, such as whether experiments in this regime will be able to test more than the Newtonian part of the gravitational field. In my talk, I will give an example of how quantum information tools such as communication protocols can contribute to identifying quantum aspects of gravity in low-energy (thought) experiments. I will then discuss directions of theoretical investigation that are needed to give a solid answer to current open questions.

TEAMS link: <https://teams.microsoft.com/l/meetup-join/19%3a8f9ec19800e7467ab9bae6e627dfcb21%40thread.tacv2/1705662207480?context=%7b%22Tid%22%3a%22ffb4df68-f464-458c-a546-00fb3af66f6a%22%2c%22Oid%22%3a%2234c00d0e-4085-4def-be95-f11f6239bc3d%22%7d>