

The **Vienna Center for Quantum Science and Technology**
(VCQ) invites you to a

COLLOQUIUM TALK

by

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On the Quantum Nature of the Coulombic Interaction

The interface between Quantum Information and Quantum Field Theory – especially Quantum Gravity – is emerging as a forefront area of fundamental physics. But there is some tension between the way the basic concept of ‘locality’ is commonly understood by the two communities. This tension descends to the issues of interpretation of precisely what would be tested by experiments that have been proposed to probe the quantum nature of gravity. Recall that Hilbert spaces $\mathcal{H}_{\text{grav}}$ and \mathcal{H}_{ph} of gravitons and photons know only about the ‘radiative modes’ of the gravitational and electromagnetic fields. But matter sources also give rise to ‘Coulombic modes’. Are the ‘Coulombic’ parts of the gravitational and electromagnetic fields produced by quantum matter also quantum mechanical, then? If so, in what sense? The ‘Coulombic modes’ are not even ‘registered’ in the Hilbert spaces $\mathcal{H}_{\text{grav}}$ and \mathcal{H}_{ph} ! Will the proposed experiments directly test the quantum nature of the ‘radiative aspects’ or ‘Coulombic aspects’? The talk will examine such elementary issues by drawing on an exactly soluble, non-perturbative quantum gravity model that is especially well-suited for this purpose.

Monday, 16th January 2023

Lise-Meitner Lecture Hall, Boltzmannngasse 5, 1090 Vienna

17:00 get-together with coffee and snacks!

The seminar talk will be preceded by a VCQ Student Talk at 17:30

Host: Markus Aspelmeyer

for further information and the zoom-link please visit
<https://vcq.quantum.at/colloquium-ws-22/>