quantA Workshop and Conference Funding Application

Event Organization:

Name, Institution and Contact Details of quantA PI:

Contact of one organizer through whom all communication will be done:

Date and Place of event:

Planned number of registered participants:

Event website:

Main target groups of the event (researchers, postdocs, PhD students etc.):

Planned overall costs for the event:

Amount asked from quantA:

Other sources of funding (please list all other sources):

Content:

quantA research areas that are addressed (see below):

Description of the relevance for quantA and the impact the event has on the quantA community (maximum of 3000 characters):

Is the event open for members of the quantA community?

Registration open from until

How will quantA be acknowledged before, at and after the event?

Documents that need to be included:

Event program (also tentative), with registration information (may be published via quantA):

Cost calculation (as attachment)

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FWF Österreichischer Wissenschaftsfonds
Funded by the European Union NextGenerationEU

1 quantA - Research Areas

2 Quantum nature of space, time, and gravity (STG)

STG 1 – *How can we understand genuine quantum concepts in the framework of general and special relativity?*
Objective: Combining the theoretical study of conceptual challenges at the gravity-quantum interface with unique high-precision quantum measurements of gravitational and special-relativistic phenomena

STG 2 – *How far can we push the quantum-classical border, or how does classicality emerge?*
Objective: Expanding the parameter regime of controlled complex quantum systems in size, mass and complexity significantly beyond the current state of the art

STG 3 – *What is the role of quantum physics regarding the nature and arrow of time?*
Objective: Defining the nature of time within the standard quantum framework and determine the degree to which one can measure and manipulate it

3 New paradigms for quantum information science (QIS)

QIS 1 – *How can we surpass the capabilities of conventional quantum information processing approaches?*
Objective: Using higher-dimensional and hybrid systems to develop new paradigms that use quantum and classical resources and other cost factors to their full potential

QIS 2 – *How can we efficiently describe and model multipartite quantum systems using a quantum information theoretical perspective?*
Objective: Efficiently using novel quantum information theoretical tools to model large quantum systems and their underlying entanglement structure

QIS 3 – *How can we optimally harness the resources of hybrid and distributed quantum systems?*
Objective: Combining the unique capabilities of different platforms to build hybrid quantum networks across Austria

4 Physics of Engineered Quantum Many-Body Systems (MBS)

MBS 1 – *How can we create and exploit programmable quantum simulators?*
Objective: Turning Rydberg atom arrays, ion crystals and superconducting circuits into simulators with new capabilities

MBS 2 – *What are the essential quantum many-body phenomena in and out of equilibrium?*
Objective: Understanding the dynamics and thermalization of coherent many-body systems and finding universal signatures in their non-equilibrium behavior.

MBS 3 – *How can we efficiently learn information about quantum many-body systems?*
Objective: Characterizing the structure and entanglement of large quantum systems and recovering the underlying laws governing the evolution of coherent and open quantum systems

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