



PE 0000023 NQSTI – Cascade Funding - Proposal Template

1) GENERAL INFORMATION

Project acronym:	QuSynKrono
Project title (extended name): <i>Text should be self-explanatory, maximum 300 characters.</i>	Open systems strategies for quantum synchronization enforcing
Spoke:	1
Topic:	2. Strategies for efficient modeling and implementation of quantum synchronization in open quantum systems
Duration (months):	18
Project location: (specify region)	Lombardia
Total project budget (€):	150.000
Total grant requested (€):	150.000
Project Coordinator:	Bassano Vacchini Università degli Studi di Milano bassano.vacchini@unimi.it +393387243153
Abstract (max 1500 characters including spaces):	
<p>QuSynKrono is dedicated to exploring fundamental aspects of quantum synchronization. The project aims to achieve three main objectives: <i>i</i>) Investigating the influence of realistic non-Markovian dissipation on synchronization initiation and exploring memory effects to enhance synchronization; <i>ii</i>) Utilizing continuous measurement techniques on the system or auxiliary channels, along with feedback strategies, to influence synchronization measures; <i>iii</i>) Implementing synchronization in quantum networks to understand the role of network features in this cooperative phenomenon. The project capitalizes on the extensive recognized expertise of the research team in the theory of open quantum systems, particularly in handling dissipation, non-Markovian effects, and feedback in continuous variables.</p>	
Keywords (Free Keywords that mainly characterize the project):	
open quantum systems; quantum synchronization; continuous measurement; non-Markovianity; quantum networks	
DNSH Principle:	
<p>In the context of the National Recovery and Resilience Plan (PNRR), our project aims to harness the transformative potential of quantum technologies while adhering strictly to the principle of 'Do No Significant Harm' (DNSH). In particular, we aim at advancing quantum synchronization in open quantum systems by addressing complex challenges with an eye on environmental, ethical, and societal well-being. We pledge to minimize environmental impacts, ensuring our quantum initiatives are energy-efficient and utilize sustainable materials. Socially, we're dedicated to inclusivity, making quantum advancements accessible to all, fostering societal progress. Ethically, we adhere to stringent guidelines to protect individual rights and data privacy, ensuring technologies serve the public good. Economically, we aim to integrate quantum innovations harmoniously, supporting existing industries and preparing the workforce for future challenges. Our commitment extends globally, emphasizing collaboration and transparency to share the quantum leap's benefits and navigate its risks together. This project is about scientific breakthroughs but about moving forward responsibly, with every action guided by a commitment to do no significant harm, ensuring quantum technology's benefits are realized sustainably and equitably.</p>	