

Project:
QUEST
(Grant Agreement number 101156088)

“Twinning to develop ELTE's research and innovation capacity in quantum reservoir computing”

Funding Scheme: Coordination and Support Action

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D9.1 One-page statement that Task 9.3 has been completed

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Document History

(Revisions – Amendments)

Version and date	Changes
1.0 – 04/10/2024	First version

Dissemination Level

PU	Public	X
PP	Restricted to other program participants (including the EC Services)	
RE	Restricted to a group specified by the consortium (including the EC Services)	
CO	Confidential, only for members of the consortium (including the EC)	



QUEST's primary goal is to amplify the scientific prowess and innovative capabilities of Eötvös Loránd Tudományegyetem (ELTE) alongside its esteemed Twinning partners: Linköpings universitet, Loughborough University, Aalto University, JustInMind SL, and Intelligentsia Consultants Sarl. They collectively aim to create a quantum reservoir computing (QRC) system leveraging silicon carbide (SiC) defect qubits. Over three years, QUEST plans to roll out a research and innovation strategy centered on five core objectives, each associated with eight interrelated work packages.

- Objective 1 is geared towards pioneering research to construct a QRC system based on SiC defect qubits. This avantgarde technology could potentially enhance computational speed and diminish power usage by over 100 times compared to traditional machine learning models.
- Objective 2 emphasizes knowledge-sharing between ELTE's seasoned researchers and the Twinning partners, facilitated via short-term staff exchanges, seminars, and training sessions, all complementing the research from Objective 1.
- Objective 3 focuses on nurturing the career aspirations of early-stage researchers associated with both ELTE and the Twinning entities. They propose strategies like brief and intermediate exchanges, workshops, summer training sessions, and a collaborative PhD scheme.
- Objective 4 aims to refine ELTE's administrative and managerial proficiency for European R&D initiatives. Specifically, this entails enhancing the expertise of ELTE's Education Support Office and Research Support Office in aspects like project management, proposal drafting, intellectual property management, and scientific communication concerning European R&D funding programmes.
- Objective 5 is dedicated to bolstering the research stature and academic credibility of ELTE and its Twinning counterparts. This will be achieved through extensive communication, outreach, and dissemination efforts.

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1. Completion of Task 9.3

D9.1 simply consists of a one-page statement that Task 9.3 has been completed (introduction in the reporting tool on the Participant Portal by month 2 of the project, all publications – related to research on point defect quantum bit systems - of the coordinator during the 3 years preceding the start date of the project).

All relevant publications from the Coordinator (Dr. Viktor Ivády, ELTE) have been uploaded on the participant portal in the “Publications” tab of the Continuous Reporting Tool. They consist of the following seven (7) journal articles.

Title of Journal Article	Authors	Title of the Journal	DOI	Publisher	Year of publication
Low-symmetry vacancy-related spin qubit in hexagonal boron nitride	R. Babar, G. Barcza, A. Pershin, H. Park, O. Bulancea Lindvall, G. Thiering, Ö. Legeza, J. H. Warner, I. A. Abrikosov, A. Gali, V. Ivády,	npj Computational Materials	10.1038/s41524-024-01361-z	Nature Publishing Group UK	2024
Accurate hyperfine tensors for solid-state quantum applications: case of the NV center in diamond	I. Takács, V. Ivády,	Communications Physics	10.1038/s42005-024-01668-9	Nature Publishing Group UK	2024
First-principles theory of the nitrogen interstitial in hBN: a plausible model for the blue emitter	Á. Ganyecz, R. Babar, Zs. Benedek, I. Aharonovich, G. Barcza, V. Ivády,	Nanoscale	10.1039/D3NR05811E	Royal Society of Chemistry	2024
Symmetric carbon tetramers forming spin qubits in hexagonal boron nitride	Zs. Benedek, R. Babar, Á. Ganyecz, T. Szilvási, Ö. Legeza, G. Barcza, V. Ivády,	Computational Materials	10.1038/s41524-023-01135-z	Nature Publishing Group UK	2023
Isotope purification induced reduction of spin relaxation and spin coherence times in semiconductors	O. Bulancea-Lindvall, M. T. Eiles, N. T. Son, I. A. Abrikosov, V. Ivády,	Physical Review Applied	10.1103/PhysRevApplied.19.064046	American Physical Society	2023
Low-field microwave-free sensors using dipolar spin relaxation of quartet spin states in silicon carbide	O. Bulancea-Lindvall, M. T. Eiles, N. T. Son, I. A. Abrikosov, V. Ivády,	Physical Review Applied	10.1103/PhysRevApplied.19.034006	American Physical Society	2023
Coherent dynamics of multi-spin VB center in hexagonal boron nitride	W. Liu,* V. Ivády,* ..., Guang-Can Guo	Nature Communications	10.1038/s41467-022-33399-2	Nature Publishing Group UK	2022