

## Report on the outcomes of a Short-Term Scientific Mission<sup>1</sup>

**Action number: CA18232**

**Grantee name: Mihály András Vághy**

### **Details of the STSM**

Title: Domain decomposition methods for quantum graphs

Start and end date: 11/10/2023 to 23/10/2023

### **Description of the work carried out during the STSM**

Description of the activities carried out during the STSM. Any deviations from the initial working plan shall also be described in this section.

During the short-term scientific mission I worked with the host (Bálint Farkas) on domain decomposition based numerical methods for quantum graphs. The main goal was to share our recent results and hopefully find connections and similarities between the problems, and possibly to define research directions we can collaborate on in the future. In particular, I shared my results on a Neumann-Neumann type substructuring algorithm, some implementation details and its performance and memory usage compared to finite elements from the literature. We also discussed how an overlapping Schwarz decomposition could be designed.

### **Description of the STSM main achievements and planned follow-up activities**

Description and assessment of whether the STSM achieved its planned goals and expected outcomes, including specific contribution to Action objective and deliverables, or publications resulting from the STSM. Agreed plans for future follow-up collaborations shall also be described in this section

The short-term scientific mission achieved its planned goals and expected outcomes, especially w.r.t. its contribution to the following Action objectives: Research Coordination 1-2-3 and 7, Capacity Building 1-2-3. Follow-up collaborations include further exploring the connections between domain decomposition methods and coupled port-Hamiltonian systems, paving the way to sophisticated algorithms for quantum graphs such as multilevel/multigrid methods, balanced Neumann-Neumann algorithms, and FETI methods, and finally discussing publication possibilities and other joint work.

<sup>1</sup> This report is submitted by the grantee to the Action MC for approval and for claiming payment of the awarded grant. The Grant Awarding Coordinator coordinates the evaluation of this report on behalf of the Action MC and instructs the GH for payment of the Grant.

