

INSTRUCTIONS TO PREPARE AN ABSTRACT FOR AQMCSE 2025

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Key Words: *Quantum annealing (QA), Computational fluid dynamics (CFD), Quantum machine learning (QML), Lattice Boltzmann method (LBM)*

ABSTRACT

AQMCSE 2025 is not just another quantum conference but it specifically aims to bring together the **quantum industry and academia** to discuss **applied quantum methods** that target **real-world applications** from the computational sciences. Fields like **computational fluid dynamics and structural analysis, optimization, material science, scientific machine learning, cryptography**, and more stand to benefit from the breakthroughs shared at AQMCSE 2025. With this first-of-its-kind thematic conference, we aim to create a platform where participants can **exchange ideas** about the non-orthodox, creative ways of using quantum devices, e.g., in **hybrid configurations** with classical computing hardware.

If you are interested in presenting your work at **AQMCSE 2025** please submit electronically an **abstract of no more than 1000 words** (and preferably one figure that illustrates your work) no later than **May 15, 2025** through the abstract submission system.

The abstract has to be written in English using the abstract template (this document) provided at <https://aqmcse.com/call-for-abstracts>. It must contain the full name and full address of author/s. In the case of joint authorships, the name of the author who will actually present the paper at the conference should be indicated by underlining it.

To help the abstract review process and the assignment of presentations to slots in the program, we request you to prepare your abstract according to the **following structure**:

1. Problem description and relevance (100-300 words)

Describe the concrete problem that your quantum(-assisted) approach is going to solve and its relevance as a real-world application.

2. Methodology (100-300 words)

Describe the concrete methodology of your quantum(-assisted) approach, e.g., which quantum algorithms are implemented, how is the quantum register prepared, how are results extracted. As the specific aim of AQMCSE 2025 is to discuss applied quantum methods, presentations should discuss the underlying methodology rather than focusing exclusively on results.

3. Practical demonstration (100-300 words)

Describe how you demonstrate the correct functioning of your quantum(-assisted) approach in practices. We expect that this can be credibly demonstrated by

- a) implementing and running the quantum algorithm on real-world quantum hardware*
- b) implementing and running the quantum algorithm on a quantum simulator*
- c) providing a fully worked-out quantum circuit*

4. Application potential (100-300 words)

Describe the potential of your quantum(-assisted) approach to be scaled up to solve realistic problem sizes, e.g., by

- a) describing a credible hybridization strategy that combines quantum computing with classical computing hardware*
- b) providing a complexity analysis of the full quantum circuit from which it becomes clear that the proposed quantum(-assisted) approach outperforms best-in-class classical approaches for a certain problem size*

The total number of words should not exceed 1000 words. Abstracts that do not follow this structure might not be considered in the review process.

Please indicate your preference for

- ☐ oral presentation
- ☐ poster presentation

The final decision on oral or poster presentation will be made by the scientific committee.

For any further request, please contact the Conference Organizers:

Email: aqmcse@cats.rwth-aachen.de

References

- [1] P.W. Shor. Algorithms for quantum computation: Discrete logarithms and factoring. Proceedings 35th Annual Symposium on Foundations of Computer Science, 124–134, 1994.