MoSaiQC | ITN

Modular Systems for advanced integrated Quantum Clocks

D3.2 Summer School

Project acronym: MoSaiQC
Project full title: Modular Systems for Advanced Integrated Quantum Clocks
Grant agreement no.: 860579

Due Date:	Month 42
Delivery:	Month 42
Lead Partner:	UMK
Editor:	Michal Zawada, UMK
Reviewer:	Georgy Kazakov
Dissemination Level:	PU
Status:	Concept
Approved:	Yes
Version:	V1.0

This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under the Marie Skłodowska-Curie grant agreement No 860579 (MoSaiQC).
This deliverable reflects only the author's view and the European Commission is not responsible for any use that may be made of the information it contains.

DOCUMENT INFO

Date and version number	Author	Comments
v0.1, 29/06/2023	Ineke Brouwer, UvA-PM	template
v0.2, 17/07/2023	Ineke Brouwer, UvA-PM Michał Zawada, UMK	version for internal review
v1.0 18/07/2023	Ineke Brouwer, UvA-PM	minor changes after internal review final version submitted

GLOSSARY

D	Deliverable
ESR	Early Stage Researcher
GA	Grant Agreement
PM	Project Manager
RC	Research Committee
SB	Supervisory Board
TC	Training Committee
WP	Work Package

Table of Contents

Executive summary

This document describes the 'School of Charged Particle Traps' that has been organised by the MoSaiQC project in a joint effort with KL FAMO (National Laboratory of Atomic, Molecular and Optical Physics) and the AQuRA (Grant agreement no. 101080166) project. The School took place on July 10-12, 2023 at the Institute of Physics, Nicolaus Copernicus University in Torun, Poland (UMK). The school was aimed at MSc and PhD students and early stage researchers. It was attended by 9 MoSaiQC ESRs, 2 MoSaiQC supervisors, the MoSaiQC PM and 33 participants from outside MoSaiQC.

1 List of contributors

Name	Organisation	Role
Ineke Brouwer	UvA (PM)	author
Michał Zawada	UMK	editor
Georgy Kazakov	TUW	internal reviewer

2 Introduction

In a joint effort with the FAMO consortium (KL FAMO) and the AQuRA project (XXX), MoSaiQC organised a Summer School titled 'School of Charged Particle Traps' that took place on July 10-12, 2023 at the Institute of Physics, Nicolaus Copernicus University in Torun, Poland (UMK). The school was aimed at MSc students, PhD students and early-stage researchers. The physics topics covered by the school were charged particle traps, storage of particles at CERN, ion clocks, and trapped ions for quantum computing. In addition, awareness of gender issues in physics and technology was strengthened by a lecture and discussion led by dr. Alessandra Candian (University of Amsterdam), an expert on STEM gender issues.

3 School organisation

The school was organised by a scientific committee consisting of the following members:

- prof. dr. Łukasz Kłosowski (KL FAMO, UMK, Toruń)
- prof. dr. Mariusz Piwiński (KL FAMO, UMK, Toruń)
- prof. dr. Florian Schreck (Institute of Physics, University of Amsterdam)
- prof. dr. Michał Zawada (KL FAMO, UMK, Toruń)

4 School advertisement

The School was advertised in the MoSaiQC, AQuRA and KL FAMO networks by email and social media posts. School details and registration were hosted on a conference website (https://indico.cern.ch/e/klfamo23 , see **Appendix I**).

5 School attendance

The School was attended by 49 participants. This consisted of 9 MoSaiQC ESRs, 8 organisers/teachers, 19 participants from UMK (15 MSc/PhD students and 4 at the post-PhD level) and 9 from other institutes (6 MSc/PhD students and 3 at the post-PhD level). Of the 45 participants 35 were male and 10 were female.

For the full participant list, see **Appendix II**.

7 MoSaiQC ESRs could not attend the Summer School. This had various reasons. For 1 ESR, the necessary visa to travel to Poland could not be obtained; 2 ESRs were in the US at the time of the School and travel to Europe was not feasible for them; 1 ESR was on secondment at the time of the School and could not combine this with attendance of the School; 1 ESR was in a crucial, time-sensitive phase of their experimental work, 1 ESR was travelling for family reasons and 1 ESR was ill at the time of the School.

6 School program

The Summer School consisted of scientific sessions, a session on gender diversity and several networking activities. The full program of the school can be found in **Appendix III**.

6.1 Scientific contributions

The scientific part of the school was organised in lectures of 2 hours each, by the following teachers:

- dr. Gustaw Szawioła (Poznań University of Technology) taught a lecture on the basics of charged particle trapping'.
- Melina Filzinger (Physikalisch-Technische Bundesanstalt) taught a lecture on ion clocks.
- dr. Ruggero Caravita (CERN) taught a lecture on the storage of particles at CERN.
- prof. dr. Lukasz Klosowski (UMK) taught a lecture on coulomb crystals.
- Matteo Mazzanti (University of Amsterdam) taught a lecture on trapped ions for quantum computing and quantum simulation.
- dr. Krzysztof Jachymski (University of Warsaw) on fundamental science with ion traps.

In addition to the lectures, there was a poster session where early-stage researchers presented their works in an informal setting. 7 posters were presented, of which 5 presented by MoSaiQC ESRs.

6.2 Session on gender diversity

As women are often underrepresented in science and in particular in physics and technology, dr. Alessandra Candian (UvA) gave a presentation and led a discussion on diversity dimensions in physics. Alessandra is a member of the Women in Faculty (WiF) board of the Faculty of Sciences of the UvA. This session was aimed to create awareness for diversity issues in physics and STEM.

6.3 Other activities

Participants could choose between a tour of the KL FAMO laboratory facilities at the Faculty of Physics at UMK and a guided tour through the historical centre of Torun.

Additionally we offered a networking dinner for all attendees of the School on Tuesday evening and a MoSaiQC-specific networking evening on Wednesday evening.

7 Deviations from the Description of the Action

The Summer School was organised according to the Description of the Action.

8 Conclusions

The Summer School 'School of Charged Particle Traps' that has been organised as a joint effort between MoSaiQC, AQuRA and KL FAMO was successful both in training of the MoSaiQC ESRs (predominantly by means of lectures) and dissemination of MoSaiQC results (predominantly by means of the poster session) as well as providing a networking opportunity within the MoSaiQC project and the larger quantum community in which MoSaiQC is embedded.

9 Appendix I: School website

10 Appendix II: list of attendees

Name	**Institute**
Aleksandr Balashov	UMK
Dobrosława Bartoszek-Bober	UMK
Marcin Bober	UMK
*Ineke Brouwer**	*UvA*
*Anna Bychek***	*UIBK*
Ruggero Caravita	CERN
Ankur Chatterjee	UMK
*Swadheen Dubey***	*TUW*
Najla El Aallaoui	University Hassan II Mohammedia
Smail El Ouedg hiri-Idrissi	University Hassan II Mohammedia

Melina Filzinger	PTB
*Andras Gacsbaranyi***	*UvA*
Abhishek Ghosh	UMK
Przemyslaw Glowacki	Politechnika Poznańska
Tarun Gupta	UMK
Krzysztof Jachymski	University of Warsaw
Kaushik Joarder	UMK
Patryk Kamiński	Gdansk University
*Georgy Kazakov****	*TUW*
Kamila Kempny	Central Laboratory for Radiological Protection
Łukasz Kłosowski	UMK
Dhiraj Kumar	UMK
Adam Ledziński	UMK
Władysław Lewicki	UMK
Indranil Maiti	UMK
Matteo Mazzanti	UvA
Piotr Morzyński	UMK
Indrajit Nandi	UMK
Mateusz Narożnik	UMK
Kwasi Nyandey	Polish Academy of Sciences
*Andrea Pertoldi***	*NKT*
*Lakshmi Rajagopal***	*BT*
Stanisław Ryzner	University of Rzeszów
Archita Sahu	UMK
Sankalp Sharma	UMK
Keerthana Soman	UMK
Aleksandra Stasik	University of Rzeszów
Gustaw Szawioła	Politechnika Poznańska
*Balsant Shivanand Tiwari***	*UoB*
*Omid Vartehparvar***	*UMK*
Antoni Węglarz	Jagiellonian University
*Mehrdad Zarei***	*UMK*
*Michal Zawada****	*UMK*
*Abhilash Jha***	*UoB*

** MoSaiQC PM*
*** MoSaiQC ESR*
**** MoSaiQC supervisor*

11 Appendix III: Summer School Program

Monday July 10, 2023

Tuesday July 11, 2023

Wednesday July 12,2023