



News Article

The 2024 COPCA Conference in Valletta

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The physical and chemical changes induced by collision processes are of indisputable significance to various fields of scientific inquiry. Indeed, the transfer of energy during a collision needs to be investigated over multiple spatial and energetic scales, ranging from the nanoscale (e.g., nanolithographic fabrication techniques during focused electron beam induced deposition) (De Teresa et al., 2016; Huth et al., 2012) to the cosmic scale (e.g., cometary or asteroidal impacts with planetary bodies in the Solar System) (Gisler et al., 2011; Toon et al., 1997). The evident multidisciplinary nature of collisions research therefore means that experimental and theoretical methodologies used in one particular field of research may prove useful to solving outstanding problems in another (Solovyov et al., 2024), and thus cross-disciplinary collaborations should be encouraged and fostered in order to further advance the current status of investigative research work. Such was the primary motivation of the inaugural *Collisions Physics and Chemistry and their Applications (COPCA) Conference*, held in Valletta in 2022: to bring together researchers from apparently disparate fields whose work relates broadly to collisions on the nano-, meso- and macroscales so as to provide new insights into ongoing research projects as well as foster the establishment of new collaborations.

Following the success and popularity of the 2022 COPCA Conference (Mifsud et al., 2023), it was decided that a follow-on event should be held in 2024. The second iteration of the COPCA Conference was successfully held between 15th – 18th October 2024 at the Valletta Campus of the University of Malta. This year, the Conference was held in concert with a workshop of the COST Action CA20129: *Multiscale Irradiation and Chemistry Driven Processes and Related Technologies*

(MultiChem),¹ chaired by Dr Alexey V. Verkhovtsev. The MultiChem COST Action aims to establish a broad, international, interdisciplinary, and intersectoral cooperation aimed at advancing our fundamental understanding of multiscale irradiation-driven processes and related technologies that will allow for major scientific and technological breakthroughs and socio-economic impacts. Through its consideration of the physical and chemical processes induced by the interaction of radiation (e.g., ions, electrons, photons) with matter, which are essentially collisions on the nanoscale, the research interests of the MultiChem COST Action align very closely with those of COPCA Conference. The logos of the COPCA Conference and the MultiChem COST Action are depicted in Figure 1.

The conference programme included a number of sessions on different aspects of collisions physics and chemistry, with a slight emphasis on irradiation-induced phenomena. Such topics included: (i) the use of modelling as a tool for understanding multiscale chemical systems and irradiation-driven phenomena, (ii) the application of high-energy science and the use of synchrotrons and plasmas, (iii) interactions between electrons and molecules, (iv) the applications of radiation science to biology and health sciences, (v) the applications of radiation research to nanoscience and materials engineering, and (vi) radiation and spectroscopy in astrochemical research. An early career researcher (ECR) presentation competition was also held at the end of the first day of the Conference, in which ECRs were given 12 minutes to orally present their PhD or postdoctoral projects. These presentations were then scored by all conference delegates according to pre-selected criteria.

The Conference also included a number of social events

¹Websites: <https://www.cost.eu/actions/CA20129/> and <https://www.mbnresearch.com/ca20129-multichem/main>

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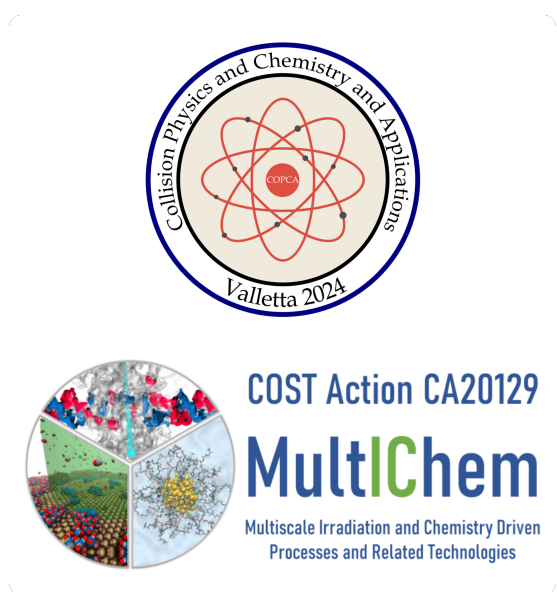


Figure 1: Logos of the 2024 COPCA Conference (*top*) and the MultIChem COST Action (*bottom*).

on Thursday 17th October, including a tour of the Hagar Qim and Mnajdra megalithic temples, where the conference photograph was taken (Figure 2). Immediately following this, a conference dinner was held at the Trattoria AD1530 restaurant in Mdina, during which prizes for the best ECR presentations were awarded. First, second, and third place prizes were respectively awarded to Cauê Souza (University of Kent, United Kingdom), David Matalon (Open University, United Kingdom), and Lars Borchert (Aarhus University, Denmark) by Prof. Nigel J. Mason in his capacity as conference co-organiser. In addition to these prizes, the organising committee of the Conference also awarded Dr Irina Solovyeva the COPCA Dedication to Science Prize in recognition of her commitment to fostering pan-European scientific collaboration.

The Conference itself proved to be a resounding success, and a fitting sequel to the inaugural conference held in 2022. The Conference allowed for collaborators who had previously met in 2022 to meet once again and renew their joint research efforts, as well as for new collaborations to be formed between researchers who had not previously met. Overall, the Conference was attended by 63 delegates and their accompanying persons from universities and research institutes in 15 different countries: Austria, Czechia, Denmark, France, Germany, Hungary, India, Italy, Kazakhstan, Latvia, Malta, Poland, Slovakia, Serbia, and the United Kingdom. The success of the Conference was also gauged through post-meeting evaluation forms that were distributed online to the delegates. A total of 37% of delegates anonymously provided feedback through these forms, with 100% of responding

delegates indicating that they were either satisfied or very satisfied with their experience of COPCA 2024 and that they would be interested in attending a future edition of the Conference. Moreover, 96% of responding delegates were satisfied with the scientific programme of the Conference, while 91% were satisfied with the venue and daily catering provided.

Following the conclusion of the 2022 COPCA Conference, a number of areas of improvement were identified for subsequent iterations of the Conference, which were accordingly adopted as goals for the 2024 COPCA Conference. The first of these goals was to increase the participation of female researchers of all career stages: in 2022, only 16% of presentations were delivered by female researchers. In the 2024 COPCA Conference, this share was increased to 23%, with female researchers also acting as chairs for 25% of the sessions held. Although such figures are reflective of a gender imbalance across science in general and physical sciences in particular, it is encouraging to note that the fraction of female presenters at the COPCA Conference is increasing. Indeed, a further increase in the representation of female scientists and researchers will be targeted for future iterations of the Conference.

The second goal that had been outlined in 2022 was the greater internationalisation of the COPCA Conference, with a specific aim to increase the participation of researchers based beyond Europe. In 2022, only one Conference delegate was based at a research institution located outside of Europe (in that year, the delegate had travelled from Colombia). In 2024, this number quadrupled, with researchers based in Kazakhstan and India travelling to Malta to attend the Conference. The increased internationalisation of the COPCA Conference is partly the result of the collaborations established during its previous iteration, and a contribution from different regions of the world will be sought in future events.

The final goal set in 2022 was the increased participation in the Conference of researchers based at the University of Malta, as well as Maltese nationals based abroad. In this regard, the 2024 COPCA Conference was not as successful as the 2022 edition. To entice both demographics (i.e., academics based at the University of Malta as well as Maltese nationals based abroad working or performing research in relevant fields) to attend the 2024 COPCA Conference, it was decided that no conference fee would be levied for these individuals. However, and in spite of a number of invitations being sent to academics working in various Departments of the University of Malta, no presentation at the Conference was delivered by a staff member or student based at the University of Malta. Furthermore, only two of the delivered presentations were



Figure 2: Conference photograph of the 2024 COPCA Conference, taken in front of the Mnajdra megalithic temple during the social excursion.

given by Maltese nationals based abroad. Should future editions of the Conference be held in Malta, more concerted efforts will be made to further encourage local researchers as well as Maltese nationals based abroad to attend and contribute their expertise and research findings.

In conclusion, the success of the 2024 COPCA Conference justifies a future iteration of the event, which is planned to be held in 2026. Aside from the aforementioned goals aimed at increasing the participation of various groups in future versions of the Conference, the next COPCA Conference will also aim to better formalise international and cross-disciplinary collaborations through official European funding streams.

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