TWISMA Project Newsletter 1

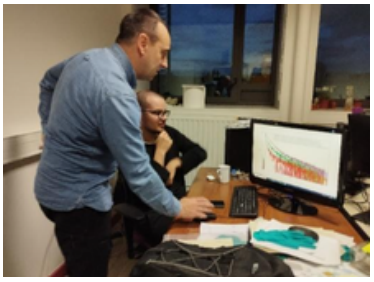
Foreword

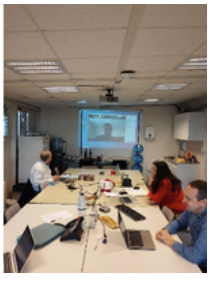
Welcome to the new information letter prepared by the TWISMA Project.

TWISMA is a Twinning project funded under the Horizon Europe programme of the European Union.
The overall aim of the project is to boost the scientific excellence and innovation capacity of the Institute for Scintillation Materials (ISMA) and its high-quality Twinning partners - European Organization for Nuclear Research (CERN) and Institute of Light and Matter (ILM) – to develop innovative calorimeters for high energy physics (HEP) based upon advanced scintillation materials.
To achieve this aim, TWISMA will implement a research and innovation strategy on innovative calorimeters for high energy physics based upon advanced scintillation materials and a series of knowledge exchange activities.

Training exchanges involving experienced researchers

Exchanges between the consortium partners are designed to facilitate collaboration and knowledge transfer among experienced researchers. The need for training ISMA personnel in high-energy physics instrumentation and obtaining prompt feedback on the parameters of Ce-doped YAG and BGO/BSO crystals contributed to the active exchanges between ISMA and CERN. Similarly, ILM researchers visited CERN to receive feedback on Ce-doped GAGG scintillators. Concurrently, CERN researchers visited ILM to enhance their understanding of garnet crystal growth processes from the melt and optimization methods for this technology.
There was a robust exchange of knowledge and skills between institutions, covering a wide array of topics such as growth technologies for bulk and shaped crystalline scintillators, characterization techniques (optical spectroscopy, scintillation characterization), and the design of calorimeters for high-energy physics.





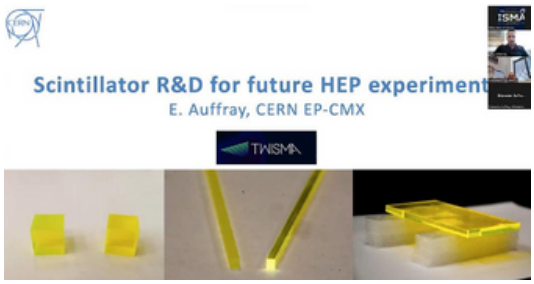

Training exchanges involving early-stage researchers

Most of the TWISMA training exchanges took place from ISMA to CERN, where the ESRs participated in the optical and scintillation characterization of garnet and BSO/BGSO scintillators developed at ISMA. Additionally, three of CERN's early-stage researchers visited ILM to share expertise in instrumentation for the characterization of scintillation materials used in high-energy physics. They gained knowledge and skills across a wide array of topics, including growth technologies for bulk and shaped crystalline scintillators, characterization techniques (optical spectroscopy, scintillation characterization), and the design of calorimeters for high-energy physics.

Summer Schools

School at ISMA

The first TWISMA school was held as a session within the international workshop for young scientists, "Functional Materials for Technical and Biomedical Applications." This session took place on September 20, 2023, at the Institute for Scintillation Materials of the National Academy of Sciences of Ukraine in a hybrid format. A total of 49 participants, including 19 attending in person, took part in the school. Specifically, 17 early-stage researchers participated in the TWISMA session.



Lecturers, representing the consortium partners, delivered a diverse range of scientific presentations to an international audience of researchers and students. The school aimed to introduce PhD students and young researchers to the latest advancements in scintillation materials, covering production, characterization, and applications.

School at CERN

The second TWISMA school was held at CERN during 21-22 November 2023. The topics of the lectures given by CERN administrative stuff addressed writing proposals for European projects, open access publications, intellectual property, involvement of industry in research collaboration. The lectures were provided in hybrid mode via Zoom. A total of 17 persons (including 7 early-stage researchers) were present in person in Geneva, and 10 (3 early-stage researchers) online attendees, mainly from ISMA.

The school attendees participated also on 23 November in the general meeting of the Crystal Clear Collaboration. It was an opportunity for them to learn about the status of development of scintillation materials and detectors for various applications, including medical tomography.

First TWISMA manuscript accepted for publication by IEEE TNS

The first manuscript on the TWISMA project “Effects of co-doping with divalent cations on performance of YAG:Ce,C scintillator”, has been accepted for publication by IEEE Transactions on Nuclear Science” (TNS) and is available online.

Click to read the article

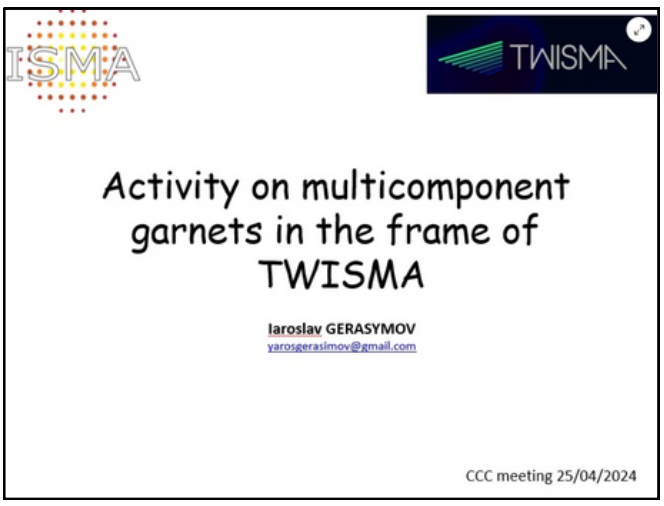
Open lecture for Ukrainian students

On April 5, 2023, Dr. Sidletskiy presented an online lecture “Why single crystals are needed and how they are produced” to the students of V. G. Korolenko Poltava National Pedagogical University in the frame of cycle of lectures “To see invisible” presented by leading scientists of Institute for Scintillation Materials NAS of Ukraine. Methods of crystal growth from melt were overviewed. The focus was on technologies employed in ISMA for growth of bulk scintillation crystals in the frame of TWISMA.

TWISMA results presented at external events

CCC meeting

Dr. Iaroslav Gerasymov presented online the report at the 81th Crystal Clear Collaboration meeting that was held in Prague on 25th April, 2024. A recent achievement in the engineering of multicomponent garnets with enhanced time resolution in the frame of TWISMA project was reported. It was a pleasure to feel a significant interest in our work, expressed through a significant number of questions to the presenter.



TWISMA activity at CERN

Prof. Oleg Sidletskiy presented a report "R&D on YAG at ISMA" at the online kick-off meeting Picocal WP3: R&D on scintillating fibres (crystal and plastic) headed by E. Auffray (CERN) and M. Zeng (Tsingua University, China).

This group in CERN deals with R&D on Phase II upgrade of LHCb calrometer in CERN where new fast and radiation tolerant scintillators are required to substitute plastic scintillators in the calorimeter. Prof. Sidletskiy presented recent results on fast-timing YAG:Ce scintillators obtained in the frame of TWISMA project. In particular, it was shown that YAG:Ce dual codoped with Mg,Ca demonstrate better timing performance compared to the well-known GAGG:Ce,Mg scintilltor.