



Newsletter Issue No. 3 December 2018

Picture courtesy of S. Kyselova; Bulletin of the Academy of Sciences of the Czech Republic (*ASCR*)

Dear Readers,

Welcome to the final issue of the ASCIMAT newsletter, where you will find all the details of the research collaboration in the field of advanced scintillation materials between the Institute of Physics of the Czech Academy of Sciences (FZU) and its Twinning partners: the European Organization for Nuclear Research (CERN), Institut Lumière Matière - Université Claude Bernard Lyon 1 (ILM-Université Lyon 1), Università degli Studi di Milano - Bicocca (UNIMIB), and Intelligentsia Consultants. The intention is to provide you with details of recent events attended and their collaborative activities.

ASCIMAT is funded by the European Commission's Horizon 2020 programme, with an overall aim to boost the scientific excellence and innovation capacity in advanced scintillation materials of the Institute of Physics of the Czech Academy of Sciences (FZU) which will be achieved by implementing a research and innovation strategy focused on three sub-topics:

1.Radiation damage and timing characteristics of scintillation materials 2.Material dimensionality influence and characteristics under different excitation modes 3.Defect influence on the transfer stage of scintillation mechanisms.

In its third year, the ASCIMAT partners have been intensively collaborating and sharing their knowledge through many successful events such as staff exchanges, summer schools, workshops as well as the international conference LUMDETR 2018, hosted by FZU in Prague.

The ASCIMAT project is approaching its final year and we are very proud to have the opportunity to share this scientific innovation journey with you.

We hope that you continue to keep up with our updates by subscribing to our website <u>h2020-ascimat</u>.

ASCIMAT Team





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ASCIMAT scientific workshop



All presentations of this event are available for downloading here.



The ASCIMAT project held their scientific workshop, « From fundamental physicas towards applications » in Prague from April 12-13, 2018, which took place at <u>the Technology Centre of the Czech Academy of Sciences</u>, of which FZU is a member. The Technology Centre is a key national institution for the research and development infrastructure, and it carries out oriented research in the area of science, technologies and innovations.

The objective of this two-day workshop was to educate about the latest scientific and technical progress on scintillation materials. The first day of the workshop involved a variety of scientific lectures at the 69th Crystal Clear Collaboration meeting, which was led by Martin Nikl and Etiennette Auffrey. The second day was more interactive with students and post-docs invited to present their research work to the audience for feedback and support.

In total, 26 young researchers and students attended the workshop from the consortium partners as well as the Czech Technical University (CTU) and Charles University (CU).





COST workshop

FZU organised an ASCIMAT workshop on aspects of fast timing in collaboration with the COST FAST project on June 14th, 2018. This one-day event was held at the Technology Centre of the Czech Academy of Sciences and divided into two sessions: i) a morning COST-related meeting with invited speaker prof. Vasiliev, who reviewed theoretical aspects of fast timing and suggested the most suitable processes to reach such a goal in a scintillation material; ii) an afternoon ASCIMAT workshop, which commenced with an invited talk from Dr. E. Mihokova, who reviewed and discussed quantum tunneling process as a specific part of luminescence mechanism, giving rise to slow decay components.



There were 21 ASCIMAT members present and the COST part served as an educational introduction into specific aspects of fast timing issues in scintillator R&D, which is an important part of the ASCIMAT training and collaboration program. Following invited speakers, several presentations were given by young members from the FZU, CERN and University of Lyon consortium partners, where they presented their current activities and results.

This workshop was an informative session and the presentations from the event are available for downloading <u>here</u>.







LUMDETR International Conference 2018

The 10th European Conference on Luminescent Detectors and Transformers of Ionizing Radiation (LUMDETR) was held in Prague during 9-14 September 2018. The conference was organized by the Institute of Physics of the Czech Academy of Sciences (FZU) and the Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague (FNSPE).

The conference provided an interdisciplinary forum for the presentation of the latest developments in basic and applied research in the field of radioluminescence, the processes of energy transfer and storage in solid state systems, the physics and chemistry of luminescent phosphor and scintillation materials, and related applications. The topics covered included:

- Radioluminescence and scintillation mechanisms, energy transfer and storage, optically and thermally stimulated luminescence in solids
- Physics and chemistry of luminescent materials for detectors and transformers of ionizing radiation, technology and preparation methods
- > Defects and their role in material performance
- > Novel phenomena, energy transfer and storage in restricted geometries, Nanophosphors, and nanocomposites
- New detector concepts and novel instrumentation
- > Application of scintillators and transformers of ionizing radiation for medical diagnostics, biological research and environmental studies
- > Application of luminescence materials in dosimetry of ionizing radiation including medical dosimetry, ion and cosmic ray dosimetry, and homeland security dosimetry
- The conference attracted 197 participants from 32 countries. More information regarding this event is available at the conference website





The 3rd ASCIMAT Summer School

The final summer school for the ASCIMAT project was held in Prague from 7-8 September 2018. Hosted by FZU, the main focus was scintillation, dosimetric and phosphor materials, prior to LUMEDETR2018. During its two-day programme, leading experts in respective fields provided lectures related to material preparation technology, advanced characterization methods and applications.

It included 16 lectures given by experts in scintillation, dosimetric and phosphor materials. In particular, the presentations by the team leaders of the consortium partners provided a broad overview of the ASCIMAT research topics, giving an insight into experimental and theoretical research issues as well as related manufacturing technologies for the discussed scintillation materials.

- Fast timing and application in medical and high energy physics field (E. Auffray),
- Nanoparticle physics and their potential for scintillator applications (C. Dujardin),
- Description and role of defects participating in energy transfer processes in scintillation materials (A. Vedda), and
- General description of scintillation mechanism and its particular features in selected material groups (M. Nikl).



In addition, former director of Crytur - K. Blazek –presented a lecture, "A company's point of view" and J. Janda of the University of Defence, Czech Republic spoke about a relevant application. There were also lectures given about the rapidly developing field of phosphors for solid state lighting by V. Jary and M. Brik.

The school was organized for university and PhD students and young scientists under the age of 35 years. It attracted 40 international participants from across Europe, China, Mexico and Russia.





In its third year, the ASCIMAT project has completed several long term as well as short term staff exchanges between the consortium partners. The results of these activities have been outstanding and the partners will continue to foster these scientific collaborations in the field of advanced scintillation materials

Staff Exchanges



UNIMIB

DEGLI STUDI DI MILANO

BICOCCA

Researchers from FZU spent 134 days in the facilities of their partner CERN, mainly devoted to training PhD students and young scientists about specific experiments at CERN related to radiation damage and fast timing namely those to measure light yield, fast decay under ps Xray excitation and using streak camera detection and finally coincidence time resolution. Most of these measurements were performed on samples prepared at FZU or collaborating university laboratories. CERN's team members were educated further about technologies for crystal growth and their bottlenecks as well as about preparing quantum dots and nanocrystals.



FZU exchanges between UCBL-ILM were extremely productive in its final year. Samples prepared in FZU's labs were brought to UCBL-ILM by secondees and underwent extensive characterization. Specifically, focused attention was devoted to the multiple quantum wells seen in InGaN/GaN nanostructures, which appear very promising for fast timing and applications where time-of-flight techniques are used (e.g. TOF-PET medical imaging, high energy physics detectors, etc.). Samples were prepared using MOVPE technology in FZU's lab and extensively characterized at UCBL-ILM.

FZU and UNIMIB continued their knowledge exchange and training through introducing young students and scientists to experiments and their technical background in the laboratories of both consortium partners. Samples prepared in FZU or collaborating labs were brought to UNIMIB by secondees and underwent extensive characterization. Excellent long-term training was provided to M. Buryi who spent over 6 months in UNIMIB's labs. He became very knowledgeable in the usage of TSL techniques and their correlation with EPR techniques (his field) in the deep study of defects and traps in luminescent materials.



FZU

Outreach activities



The Night of Researchers event, « Meet me tonight » was held from 28-29 September 2018 in Italy. With more than 2000 researchers in attendance across the country, Dr. Anna Vedda participated as a speaker in the « EU Corner », a discussion session where researchers addressed the general public and explained their involvement in EU projects. It also included a « speed-dating » activity where they would speak face-to-face for five minutes at a time.





The event was informative and beneficial to a diverse audience of participants. It was also an excellent opportunity to showcase the achievements and activities of the ASCIMAT and <u>INTELUM</u> projects, of which FZU, CERN, UCBL-ILM and UNIMIB are also partners.

For more information, please visit the event website

To learn more about the ASCIMAT project and to keep up with its activities and achievements, please visit the website:

www.h2020-ascimat.com/



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 690599