2nd edition, March 2026

IFIGENEIA'S NEWSLETTER

1 Reflections on the First Year of IFIGENEIA

Dear colleagues,

As we approach the end of the first year of activities within the IFIGENEIA project, we are pleased to reflect on the progress we have collectively achieved.

In the early months, significant attention was devoted to the work package connected to communication, dissemination, and outreach (WP2), where with the support of our partners, we established the foundations for effective promotion, dissemination, communication, and outreach. This included the development of the visual identity, key communication documents, and the launch of the project website, which now serves as an important driver for community building. Later, we expanded our outreach by opening the official LinkedIn profile to further strengthen our connection with target audiences.

Throughout the year, numerous training activities, promotional events, and professional meetings took place. We would like to highlight in particular the lecture delivered by Prof. Dr. Joao Seco in Ljubljana, Slovenia, in November 2025, at the *International Day of Medical Physics*. He gave lectures at both the Faculty of Mathematics and Physics, and the Faculty of Medicine of the University of Ljubljana. The second lecture was recorded by colleagues at the Jožef Stefan Institute and is available on the project website. During Prof. Seco's visit, we also conducted a short interview, which you can find in this issue of the newsletter.

Equally noteworthy were the stakeholder meetings dedicated to establishing the Excellence hubs, held in Slovenia in March 2025, in Cyprus in September 2025 and several meetings in Greece in autumn 2025 and in winter 2026. Across the consortium, IFIGENEIA partners attended several conferences and professional events, sharing insights about the project and strengthening its visibility within scientific and expert communities. In the field of communication and outreach, activities were particularly dynamic in Bosnia and Herzegovina, where partners presented IFIGENEIA at conferences, meetings, and public events, as well as to students.

Toward the end of the year, the project's Editorial Board was established, composed of work package leaders. Its aim is to ensure the provision of high-quality scientific and expert content for various communication channels and target groups.

The partners of the IFIGENEIA project would like to sincerely thank everyone who engages with the project and its activities. Your interest and encouragement support our efforts to develop innovations that may one day improve patient care across Europe.

We wish you an enjoyable read and invite you to stay connected with IFIGENEIA.

Urška Mrgole

Jožef Stefan Institute

2 Interview

An Overview of Cancer Research with Prof. Dr. DABR. Joao Seco

Insights into Cancer Research

Lead: Jožef Stefan Institute | **Objective:** Highlighting the importance of the Cancer Research

In November 2025 Prof. Dr. DABR. Joao Seco held several lectures and presentations in Slovenia about the cancer treatments from different perspectives.

In the scope of his visit, he also shared his insights on how the cancer research has developed in the past years and decades, about the different approaches in Europe and USA, and how IFIGENEIA project supports cancer research and therapies.

What was your motivation to dedicate your life and career to the cancer research?

From a young age, I was driven by a curiosity about how the world works and a deep desire to become a scientist. This passion led me to study physics, a field where my interests in both physics and mathematics naturally converged. During my undergraduate studies, I had the opportunity to explore a variety of research areas, including particle physics and superconductivity. While each area was intellectually stimulating, I found myself most inspired by medical physics, the powerful intersection between physics and patient care. Seeing abstract physical principles translate into real clinical applications showed me how science can directly improve human health. That experience sparked my commitment to apply scientific discovery in ways that meaningfully impact patients' lives. This motivation ultimately shaped my decision to pursue a career dedicated to advancing medical science.

Cancer treatment is changing. As recent advancements in radiation oncology show, FLASH-RT, SFRT and TRNT promise enhanced efficacy, safety and personalisation. What are the main differences between current cancer research and therapies compared to those that were available when you first began with your career as a young PhD graduate?

When I began my PhD, radiation therapy was undergoing a major transformation with the development and early clinical implementation of intensity-modulated radiotherapy (IMRT). At that time, only a handful of hospitals around the world had the capability to deliver IMRT treatments. My doctoral research focused on IMRT at one of these pioneering centers, and within five to ten years of completing my PhD, this technique had become widely adopted, evolving into the standard of care in radiotherapy worldwide.

In the past decade, another revolution has emerged with the discovery of immune checkpoint inhibitors

(such as anti-PD-1, anti-PD-L1, and CTLA-4 antibodies). Immunotherapy has reshaped the landscape of cancer treatment and is increasingly being combined with established modalities, including radiotherapy. The integration of immunotherapy and radiation therapy holds tremendous promise, with the potential to further transform cancer care and significantly improve patient outcomes.

What is the latest main breakthrough in cancer therapy, and will it shape the future of research and patient treatment?

The single most important breakthrough in cancer treatment over the past 10 to 15 years has been the advent of immunotherapy, particularly through the use of immune checkpoint inhibitors such as anti-PD-1, anti-PD-L1, and CTLA-4 antibodies. Immunotherapy has opened entirely new possibilities for treating even the most advanced and previously untreatable cancers. By harnessing the patient's own immune system to recognise and attack tumour cells, this approach has fundamentally changed our understanding of cancer biology and treatment potential. The integration of immunotherapy with radiotherapy and other modalities continues to push the boundaries of what can be achieved in cancer care, offering hope for durable responses and long-term remission in diseases once considered incurable.

What is needed to achieve the next breakthrough in cancer treatment?

This is a very complex question to answer, but I will do my best. Achieving the next major breakthrough in cancer research will require a combination of several key factors. First, we need a strong foundation of highly trained and skilled scientists. Second, access to state-of-the-art research facilities and technologies is essential to enable cutting-edge experimentation and discovery. Third, a large cohort of motivated young researchers, at the master's and PhD levels, must be actively engaged in research projects, bringing fresh perspectives and energy to the field. Finally, sustained and substantial funding is crucial to support scientists at all career stages, from early trainees to the most experienced investigators, ensuring that innovative ideas can be developed and translated into real clinical progress.

Project IFIGENEIA connects linear accelerators with cancer treatment. In general perception, we usually consider accelerators as large and complex structures like the one in CERN. What are linear accelerators and how can they help us in cancer therapy?

A linear accelerator (often called a linac) is a type of machine that accelerates charged particles, such as electrons or protons, along a straight path using electromagnetic fields. In the context of cancer therapy, a medical linear accelerator (LINAC) is one of the most important and widely used tools in modern radiation oncology. Within the scope of IFIGENEIA, linacs can play a critical role in the production of new radioisotopes for targeted radionuclide therapy (TRNT). Currently, TRNT faces a significant shortage of radioisotopes, limiting treatment options for many patients with advanced cancers. By enabling the production of these essential isotopes, linacs have the potential to expand the availability and effectiveness of TRNT, ultimately improving outcomes for patients who currently have few therapeutic alternatives.

With academia and working experience from the UK, USA and Germany, what are the main differences between the UK, USA and Germany for research?

In Europe, the majority of cancer research is conducted in dedicated research institutes focused on developing novel techniques, ideas, and methods to combat cancer. For example, in the UK, the largest cancer research institution is the Institute of Cancer Research (ICR), while in Germany, the German Cancer Research Center (DKFZ) accounts for approximately 80% of cancer-focused research. Because much of this work is performed in specialised research institutes, the majority of European cancer research emphasises basic science, with clinical translation occurring only at later stages. In contrast, in the USA, cancer research is largely carried out within university hospitals, where clinical translation is the primary focus and basic research plays a comparatively smaller role. As a result, clinical research in the USA is primarily driven by clinician-scientists, while in Europe, basic research is largely driven by career research scientists. This structural difference shapes the research priorities and timelines for translating discoveries into patient care in the two regions.

Can we expect the cancer will be one day just an "ordinary" disease?

Cancer can broadly be divided into two main categories: early-stage and late-stage disease. Currently, early-stage cancer is often considered a relatively “ordinary” disease, in the sense that multiple treatment options are available that can achieve similar outcomes, namely, the potential cure of the cancer. The primary differences among these treatment approaches lie in the side effects and impact on the patient’s quality of life, rather than in overall survival. In contrast, late-stage cancer is far more complex and challenging. It is rarely, if ever, considered “ordinary,” due to the high heterogeneity of the disease and the fact that very few treatments offer a true cure. Modern therapies for advanced cancer are primarily designed to prolong survival and improve quality of life, rather than to eradicate the disease completely. As a result, research in late-stage cancer focuses heavily on developing novel targeted therapies, FLASH, SFRT, immunotherapies, and combination treatments, with the goal of controlling disease progression, reducing symptoms, and extending meaningful survival for patients who currently have limited options.

If you are interested to learn more about the cancer research, we invite you to watch IFIGENEIA video lecture “New technologies for cancer treatment: FLASH, SFRT and TRNT”, where Prof. Dr. DABR. Joao SECO shared more insights into new promising cancer therapies with interesting facts:

https://ifigeneia.eu/new-technologies-for-cancer-treatment-flash-sfrt-and-trnt-ifigeneia-video-lecture/

The visit of Prof. Dr. DABR. Joao SECO in Slovenia also sparked the interest of Slovenian journalists, and he participated in the prime-time news program *Odmevi* on Slovenian national television TV SLO 1, where he shared his thoughts on cancer treatment, new methods, and national screening programmes for cancer early detection. The TV recording is available below (the introduction by the news anchor is in the Slovenian language, while the main conversation is in English):

https://ifigeneia.eu/presentation-of-new-and-promising-technologies-for-cancer-treatment-with-prof-dr-dabr-joao-seco-in-slovenia/

3 Featured Article

Cancer in Europe: A Growing Challenge Towards 2040

Lead: RTD Talos Ltd | **Objective:** Understand regional cancer trends

Cancer represents a growing public health challenge across European countries and the wider region, with incidence levels increasing steadily over the past decades. Across both EU Member States and neighbouring European countries, historical data reveal a clear upward trend in the number of cancer cases, driven by population ageing, lifestyle-related risk factors, environmental influences and improved diagnostic capacity. Countries such as Cyprus, Greece, Slovenia, Bosnia and Herzegovina, as well as Serbia, Croatia, Kosovo, North Macedonia, Albania, Bulgaria, Montenegro and Romania, experience similar patterns of rising cancer incidence, highlighting a shared and pressing regional challenge. What was once a gradual rise has evolved into a sustained and measurable increase, placing growing pressure on healthcare systems and cancer care infrastructure across Europe.

In Cyprus, cancer incidence has followed a consistent upward trajectory since the late 1990s. Data from the Ministry of Health of Cyprus, for the years 1998-2022 indicate a steady rise in the absolute number of diagnostic cases, a trend that is expected to continue in the coming years. Projections suggest that cancer cases will reach approximately 4986 in 2025, increasing to 5802 by 2030, 6676 in 2030, and around 7607 by 2040. Breast, prostate, colorectal and lung cancers remain the most prevalent, while the increasing share of cases classified as ‘other’ cancers reflects a progressively more complex oncological landscape.

In Greece, cancer represents one of the most significant and persistent health burdens. Incidence levels remain high, affecting a substantial percentage of the population, and are projected to rise further over the coming decades. Although historical data can be concatenated and from scared resources, the number of new cancer incidences in 2022 was 65703 based on the Global Cancer Observatory. It is expected that the total number of cancer cases will reach approximately

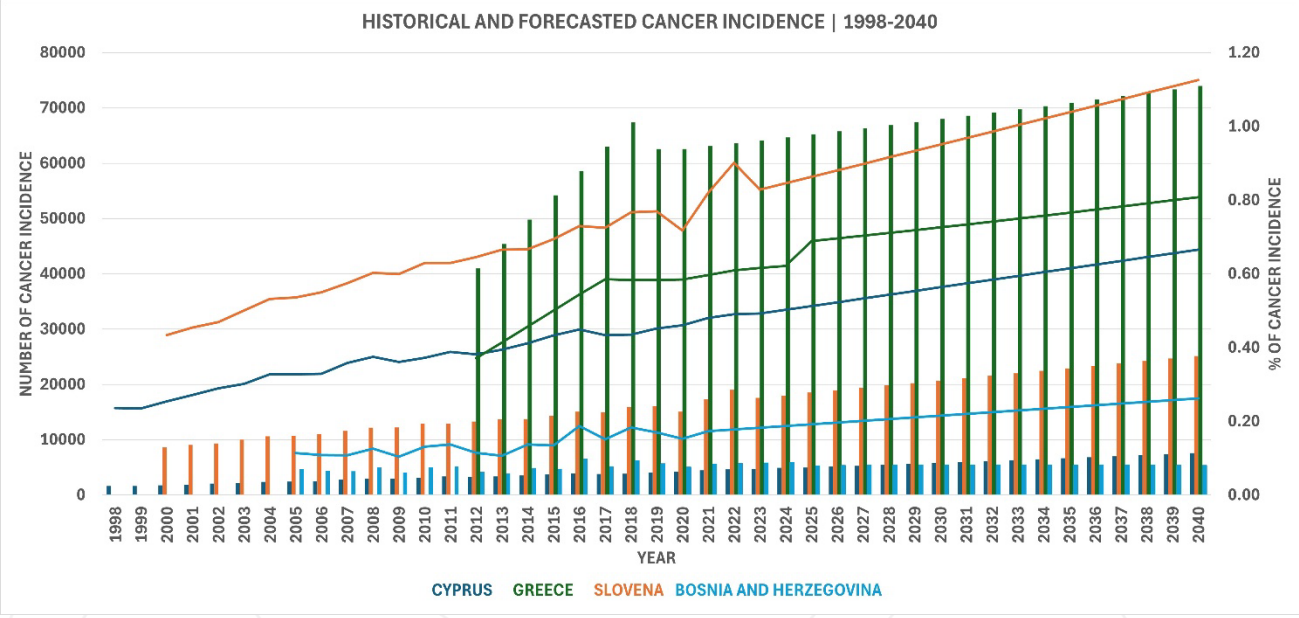
65235 in 2025, increasing to 68021 by 2030, 70940 by 2035, and around 74000 by 2040. Breast, prostate, colorectal and lung cancers continue to account for a substantial proportion of diagnosis, while a wide range of other cancer types contributes to the overall disease burden, highlighting the scale and complexity of cancer care needs in the country.

In Slovenia, in 2022 new cancer cases were 19032, based on the Institute of Oncology of Ljubljana. Cancer incidences have increased steadily over time, reflecting demographic changes and rising life expectancy. This upward trend is projected to continue, with cancer cases expected to reach approximately 18535 in 2025, rising to 20693 by 2030, 22903 by 2035 and around 25164 by 2040. The cancer profile is dominated by breast, prostate, colorectal and lung cancers, underscoring the growing heterogeneity of the disease burden.

In Bosnia and Herzegovina, cancer incidence remains substantial as by year 2020 it has reached 5035 new incidences, based on the Institute for Public Health FB&H. Although projections suggest more moderate growth and eventual stabilization compared to other countries in the region. The number of cancer cases is expected to reach approximately 5328 in 2025, increase to 5452 by 2030 and 5461 by 2035, before slightly declining to around 5355 cases by 2040. Despite the stabilization that comes from the projections of the declining population of the country, cancer continues to pose a significant challenge, with lung, breast, prostate and colorectal cancers among the most common.

Behind each of these figures are individuals, families and communities facing the physical, emotional, and economic burden of the disease. Across Europe and the wider region, the sustained increase or persistently high level of cancer incidence highlights an urgent need for proactive and forward-looking action. As diagnoses continue to rise, the demand for timely diagnosis, effective treatment, and innovative therapeutic solutions becomes increasingly critical.

Against this backdrop, the IFIGENEIA project addresses key challenges in modern nuclear medicine by introducing advanced LINAC (Linear Accelerator) technology. The project aims to enable the production of new medical radioisotopes, including Lu-177, which play a crucial role in targeted radionuclide therapies. By strengthening regional radioisotope production capacity, IFIGENEIA is expected to enhance security of supply, support innovation in cancer treatment and contribute to the opening and development of the radiopharmaceutical market, improving patient access to advanced therapies while fostering growth and technological progress across Europe.



Graphic 1: Historical and forecasted cancer incidence 1998-2040; *Source: Own analysis, based on publicly available data.*

4 Spotlight on Current Project Activities

RFQ Construction: Knowledge Transfer for Health and Cultural Heritage

Lead: Aristotle University of Thessaloniki

Within the framework of the IFIGENEIA project, an RFQ (Radio Frequency Quadrupole) demonstrator will be developed at the Aristotle University of Thessaloniki, in close collaboration with the Greek company YFOS. This demonstrator will serve as proof of principle for RFQ design and construction, directly supporting IFIGENEIA's objective to strengthen European capacity in accelerator-based technologies and facilitate the transfer of research expertise into societal applications.

The IFIGENEIA RFQ demonstrator is inspired by the ELISA (Experimental LInac for Surface Analysis) accelerator, developed for the CERN Science Gateway. ELISA is a linear proton accelerator installed in the Science Gateway exhibition at CERN since October 2023, designed primarily for education and outreach. Through close collaboration with CERN experts, AUTH researchers and engineers will gain hands-on experience covering the full RFQ design, construction and operation phase.

This activity also builds on a long-standing collaboration between the Physics Department of Aristotle University of Thessaloniki and the CERN Accelerator and Beam Physics group. Under the scientific guidance of Dr Ioannis Papaphilippou, Group Leader of CERN/ABP and Visiting Scientist at AUTH, this collaboration has supported joint research, training, and education in accelerator physics over several years.

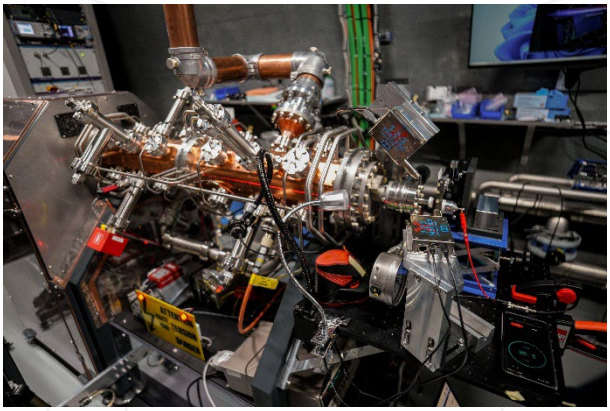
A central pillar of IFIGENEIA is the active involvement of industry in advanced accelerator development. In this context, the construction of the RFQ demonstrator will be carried out by the Greek company YFOS, working closely with CERN and AUTH. This collaboration ensures that accelerator know-how is transferred beyond academia and embedded within national industry, strengthening sustainable technological capabilities in Greece. The successful demonstration of this RFQ linac represents a critical milestone within IFIGENEIA. It will establish the technical readiness required to design and construct a more demanding RFQ-based LINAC dedicated to radioisotope production for medical applications. This future facility represents the final scope of the IFIGENEIA pathway, addressing the growing demand in the Balkans and Europe in general, for reliable, reasonably priced and locally produced medical radioisotopes for diagnostics and therapy.

The ELISA-inspired RFQ will remain permanently at the University of Thessaloniki as a tangible outcome of IFIGENEIA. It will serve both as an irradiation facility for cultural heritage studies and as a hands-on training platform for students. Its educational and societal impact will ensure the transfer of knowledge and will pave the way towards a future medical radioisotope production facility.

Stay tuned for the next steps of IFIGENEIA, as knowledge transfer evolves into sustainable medical applications.

#IFIGENEIA #HorizonEurope #RFQ #CERN #Radioisotopes #KnowledgeTransfer #GreekIndustry #SocietalApplications #MedicalApplications

Graphic 2: ELISA RFQ accelerator at the CERN Science Gateway, Source: CERN Science Gateway – ELISA RFQ accelerator, © CERN



Building Public Trust in Nuclear Medicine Innovation

Lead: Cyprus Association of Cancer Patients & Friends (PASYKAF)

Innovative nuclear medicine technologies, such as LINAC-based systems developed within the IFIGENEIA project, have the potential to significantly enhance diagnostic and therapeutic capabilities in healthcare. However, public understanding and acceptance are critical factors influencing the successful adoption of such technologies. PASYKAF contributes to IFIGENEIA by addressing the societal and ethical dimensions of nuclear medicine innovation, with a particular focus on building trust among patients and the wider public.

The term “nuclear medicine” can evoke uncertainty or concern, especially among patients already facing the emotional burden of a cancer diagnosis. Misconceptions about safety, radiation exposure, and long-term effects may create barriers to acceptance if not proactively addressed. Patient organisations play a key role in bridging this gap between scientific innovation and public understanding.

Through its involvement in IFIGENEIA, PASYKAF will support transparent, patient-oriented communication strategies that explain the benefits, safety measures, and purpose of LINAC-based technologies in accessible language. Drawing on its extensive advocacy experience, PASYKAF highlights the importance of dialogue, education, and ethical sensitivity when introducing advanced medical infrastructures.

Civil society engagement strengthens innovation by ensuring that technological progress aligns with societal values and patient expectations. By involving patient organisations early in the innovation process, IFIGENEIA fosters a climate of openness and accountability, contributing to long-term sustainability and public confidence.

Integrating social perspectives alongside scientific excellence enables IFIGENEIA to advance nuclear medicine in a way that is not only effective, but also

trusted, accepted, and supported by the communities it aims to serve.

#IFIGENEIA #HorizonEurope #PatientAdvocacy #NuclearMedicine #PublicTrust #EthicalInnovation #HealthCommunication

Interested in Innovative Applications of Particle Accelerators for Medicine and Society?

Lead: University of Cyprus

Apply to the programme by 15 April!

Under the Task 6.2, part of Work Package 6 (WP6) on Training, Education, and Skills Development (which is part of WP6: Mentorships), within the IFIGENEIA project, the Master Classes in Particle Therapy, offer an advanced training opportunity for students, early-career researchers, medical physicists, oncologists, and radiation therapists who want to understand how cutting-edge accelerator technologies are shaping modern cancer care.

Particle therapy — including proton and carbon ion therapy — is one of the most advanced approaches in oncology today. Through expert-led lectures, clinical case studies, demonstrations, and interactive discussions, participants will gain insight into treatment planning, beam delivery systems, dosimetry, and patient management in real clinical settings.

For students and young professionals, following courses like these is a crucial step toward building a strong and future-oriented career. The master classes help bridge the gap between accelerator physics, engineering, and clinical practice, showing how fundamental technologies translate into direct patient benefit.

A dedicated focus is placed on the role of linear accelerators, not only in particle therapy but also in the production of radiopharmaceuticals used for diagnostic imaging and targeted cancer therapy. Understanding how accelerators enable the fabrication of medical radioisotopes is essential for advancing nuclear medicine, supporting personalised treatments, and strengthening regional healthcare infrastructures.

By combining online learning with an immersive on-site experience, the Master Classes in Particle Therapy provide a unique opportunity to learn, connect, and engage with an international community working at the forefront of accelerator-based medicine.

If you are motivated to explore how particle accelerators can improve cancer diagnosis and treatment, this programme is not to be missed.

Full details on eligibility and the application process are available through the IFIGENEIA project channels (**deadline for application has been extended until 15 April 2026** – for details check out): https://ifigeneia.eu/sarajevo2026-10-days-of-cbi-training-for-student/

The Master Classes in Particle Therapy combine online preparation with an intensive on-site experience:

- **Tuesday, September 1st:** Online "Getting to know each other" meeting
- **September 3rd –17th:** Online seminar series on particle accelerators and their applications
- **Tuesday, September 22nd–Thursday, October 1st:** On-site master class in Sarajevo, including accommodation and a visit to Mostar
- **Thursday, October 1st:** Final presentations at the University of Sarajevo and award ceremony *(programme ends at 15:00)*

5 Events

Past

- **International Conference on Medical and Biological Engineering in Bosnia and Herzegovina** (CMBEBIH 2025): 11 – 13 September 2025, Sarajevo, Bosnia and Herzegovina.
- **Cyprus-HUB Infoday meeting**: 29 September 2025, Nicosia, Cyprus.
- **The annual congress of European Association of Nuclear Medicine (EANM 2025)**: 4 – 8 October 2025, Barcelona, Spain.
- **EFOMP - 2nd Symposium on Molecular Radiotherapy Dosimetry: The Future of Theragnostics (SMRD2)**: 13 – 15 November 2025, Athens, Greece.
- **12th International Conference on Isotopes (12ICI)**: 15 February 2026, Florence, Italy.

Future

- **21st European Molecular Imaging Meeting (EMIM 2026)**: 24 – 27 March 2026, Ljubljana, Slovenia.
- **Open Day at Jožef Stefan Institute – Accelerator**: 28 March 2026, Dol pri Ljubljani, Slovenia.
- **22nd European Symposium on Radiopharmacy and Radiochemistry (ESRR 2026)**: 16 – 19 April 2026, Bergen, Norway.

Welcome!

6 Did You Know?

#1 The IFIGENEIA links academia, government, industry & society in a true quadruple-helix approach. #OpenInnovation

#2 Within IFIGENEIA, over 1500 citizens across 6 countries will be engaged through events and outreach by 2029. #PublicEngagement

Contact us!

Designed by: Jožef Stefan Institute

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