

# Photonics in the EU Framework Programme

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Photonics21

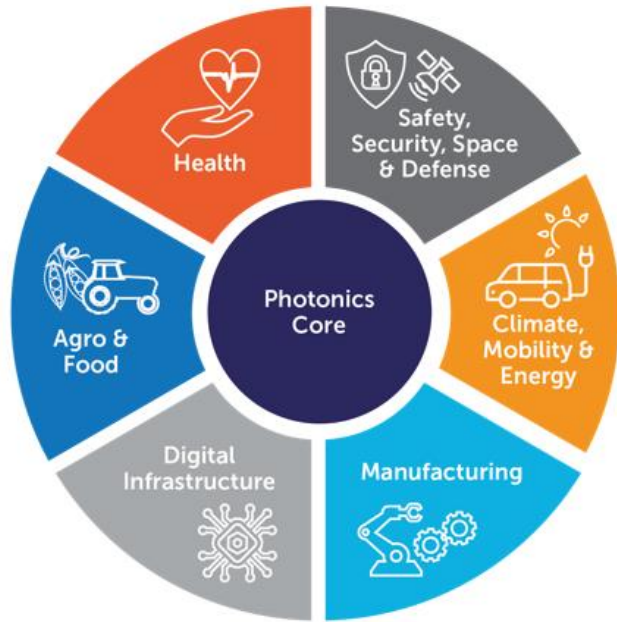


# Outline

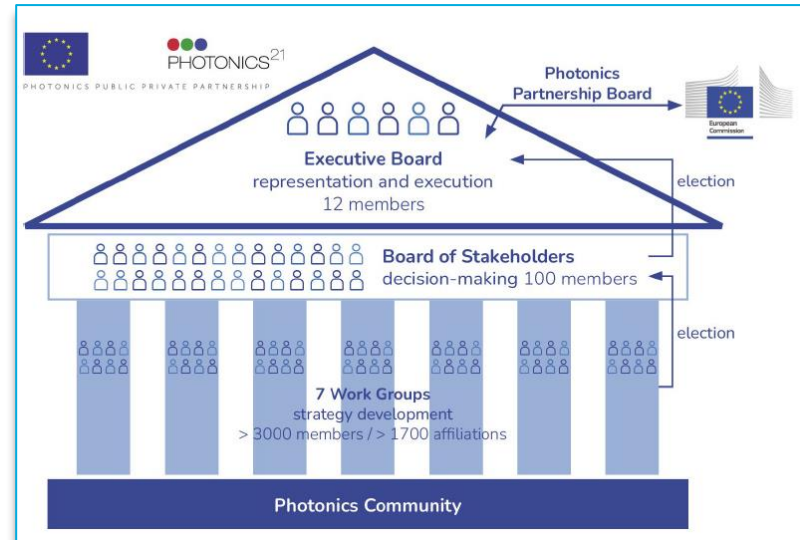
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- Horizon Europe Photonics Partnership – call priorities 2025
- Photonics in Chips Act
- Photonics in the 10th EU Framework Programme

# Photonics21: European Photonics Stakeholder Organisation



- ✓ More than 4000 members; democratically organized
- ✓ Advises European Commission on photonics R&I priorities
- ✓ 7 Photonics21 work groups



# Photonics Partnership in Horizon Europe 2021-27



- ✓ ~ €480 Mio EUR EC funding; Partnership only instrument to ringfence budget for an area
- ✓ Strategic Research and Innovation Agenda sets strategic priorities – basis for call topics



## PILLAR II – Global challenges & European industrial competitiveness

## PILLAR III – Innovative Europe

Cluster 1: Health	Cluster 4: Digital, industry and space	Cluster 5: Climate, energy and mobility	Cluster 6: Food, bioeconomy, natural resources, agriculture and environment	EIT: The European Institute of Innovation and Technology	European innovation ecosystems
Innovative Health Initiative	Key Digital Technologies	Clean Hydrogen	Circular Bio-based Europe	EIT InnoEnergy	Innovative SMEs
Global Health EDCTP3	Smart Networks and Services	Clean Aviation	Biodiversa+	Climate-KIC	
Transformation of Health Care Systems	High Performance Computing	Single European Sky ATM Research 3	Blue Economy	EIT Digital	
Risk Assessment of Chemicals	European Metrology (Art. 185)	Europe's Rail	Water4All	EIT Food	
ERA for Health	AI-Data-Robotics	Connected, Cooperative and Automated Mobility	Animal Health and Welfare	EIT Health	
Rare Diseases	Photonics	Batteries	Accelerating Farming Systems Transitions	EIT Raw materials	
One-Health Antimicrobial Resistance	Made in Europe	Zero-emission Waterborne Transport	Agriculture of data	EIT Manufacturing	
Personalised Medicine	Clean Steel – Low-Carbon Steelmaking	Zero-emission Road Transport	Safe and Sustainable Food Systems	EIT Urban Mobility	
Pandemic Preparedness	Processes4Planet	Built4People		Cultural and Creative Sectors and Industries	
	Globally Competitive Space Systems	Clean Energy Transition			
		Driving Urban Transitions			

### CROSS-PILLARS II and III

European Open Science Cloud

- Institutionalised partnerships (Art 185/7, EIT KICs)
- Co-programmed
- Co-funded
- Not covered in the BMR 2022 due to a later start date

# Photonics21 call priority proposals for Horizon Europe 2025-27



<u>Topic</u>	<u>Type</u>	<u>TRL</u>	<u>Year</u>
<b>Development of active sensor technologies and multimodal sensor integration for multiple application domains</b>	IA	TRL > 5	2025
Ultra-high efficiency photonics	IA	TRL > 5	2026
Extended functionality in integrated photonics	RIA	TRL 1-5	2027
Education and training	CSA		2025
Photonics21 Secretariat	CSA		2026
<b>Joint application call (tbd) [e.g. Metaverse / Manufacturing Partnerships] ?</b>	tba	tba	2025
Joint application call (tbd) [e.g. Mobility / Battery Partnerships] ???	tba	tba	2026
Joint application call (tbd) ???	tba	tba	2027
<b><i>[Chips JU]</i></b>			
<i>Sustainable, environmentally friendly manufacturing of photonic components and systems</i>	IA	TRL > 5	tba
<b><i>Pilot lines and competence centres for advanced integrated photonics and PIC technologies, including electronic-optical systems</i></b>	IA	TRL > 5	tba
<i>Co-design and manufacture of photonic components and systems with microelectronics and complementary technologies</i>	RIA	TRL 1-5	tba

# Photonics in the Chips Act

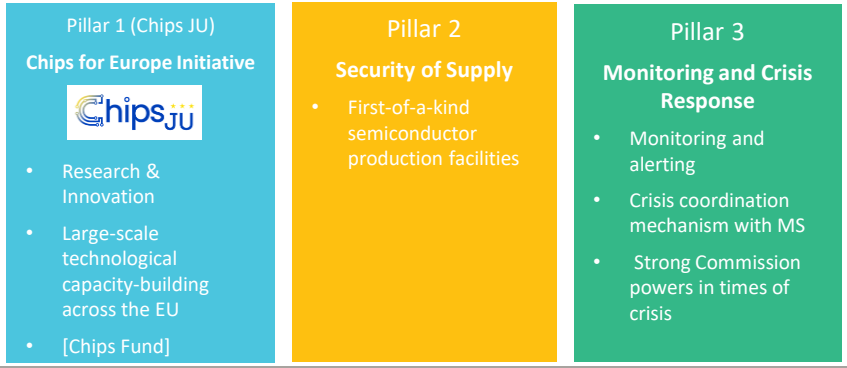


# Photonics21: Focus on Pillar 1 of the Chips Act





Create a state-of-the-art European chip ecosystem

European Semiconductor Board (Governance)





Aim: Photonics21 to become part of the Chips JU Governance / Observer role

**Quantum PIC Position Paper**  
April 2022

Joint Focus Group from the Quantum Flagship and Photonics21

**White Paper on Integrated Photonics**

authored by a Joint Focus Group of the European Association on Smart Systems Integration (EPoSS) and the Photonics21 FPP



Michael Schödl, Michael J. Webb, Thor Aalto, Michael Achermann, Luc Augustin, David Bédard, Sonia Garcia Blanco, Patricia Cogez, Marcus Danilow, Pau van Dijk, Gerhard Dornann, Amir Ghaffari, Martin Heck, Thomas Heuser, Andreas Klug, Renaud Del Longo, Martin Mariani, Christian Meyer, Clifford Murray, Sylvia Nimmer, Rüdiger Oelshöfer, Mehmet Cengiz Özbay, Joseph Parker, Ryszard Piambowicz, Abhishek Prasad, Graham Reed, Javier Rivera, Erik Roca, Martin Schell, Elizabeth Steinmetz, Martin Steinbach, Bernhard Stangl, Talga Teich, Dao Thang Duy, Dries van Thourhout, Marja Trajčević, Gintaras Vlasius, Lennart de Vroede, Markus Wilkens, Martina Wisniewski, Benjamin Wohlfiel, Lars Zentgraf

April 2023

**Joint White Paper**





**Photonics Industry Supply Chain Analysis**

**Photonics Industry Supply Chain Survey 2023**

PHOTONICS21/EPIC  
April 2023





# Integrated Photonics included in the Chips JU Roadmap



## Quantum PIC Position Paper

April 2022

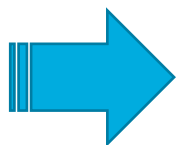


## White Paper on Integrated Photonics

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April 2023



- Integrated Photonics
  - New materials for active photonic devices, such as 2D materials, Lithium Niobate, Indium Phosphide; for improved performance, such as higher bandwidth in modulators, and detectors.
  - Light sources (e.g. lasers and laser modules) with higher power and better performance and with tunable wavelength, using external cavity on photonic integrated circuits (PIC).
  - New waveguide materials and components to expand the wavelength range from UV up to mid IR optical elements for beam shaping and manipulation (like ultrathin curved waveguides, meta-lenses, tunable lenses and filters, next generation holograms, ultra-wide-angle holograms)
  - Display technologies (like micro-LEDs, MEMS-mirrors, Phase Arrays) and sensors (e.g. for eye tracking)
  - New devices for Quantum PICs

- Communications:
  - Module-level high-speed wireless communication features, including current and new frequency bands.
  - High-speed **photonics** communications modules beyond 1 Tb/s.

- Integrated Photonics and co-integration with electronics
  - Photonic-electronic system integration based on integrated photonics, including high-speed RF electronics, MEMS/NEMS sensors, etc.

- Multi-domain electro-photonic integration and electro-optic co-packaging.
- Wafer-level integration of photonic and electronic components for smart emitters and detectors
- Enabling electronic-photonic systems by heterogeneous integration of active components on PICs (III-V semiconductors, ferroelectrics, ultra-low-loss waveguide materials).
- Heterogeneous integration processes and equipment for integrated photonics, including high-precision component placement and bond
- Quantum PICs: Integration of single photon device system in PICs.

### Topic 1.3: Integrated photonics

- Novel devices operating at different wavelengths than used for telecom
- Co-packaging and integration of integrated photonics and high-speed electronics
- Photonic health and medical sensors

- Tunable laser sources for PICs
- Materials and devices for Quantum PICs.
- optical elements for beam shaping and manipulation (like ultrathin curved waveguides, meta-lenses, tunable lenses and filters, next generation holograms, ultra-wide-angle holograms)
- display technologies (like micro-LEDs, MEMS-mirrors, Phase Arrays) and sensors (e.g. for eye tracking)

- Growth of light-emitting structures on silicon and integration into photonic platforms
- Analogue and Neuromorphic photonic computing

Source: chips-ju.europa.eu





# Chips JU – Pilot line on photonics possible

Chips GB 2023.58 – Appendix 4



## 2.2. Chips-2024-CPL-5: Additional pilot line(s)

<b><i>Chips-2024-CPL-5</i></b>	
Max EU Expenditure <ul style="list-style-type: none"> <li>Joint procurement</li> <li>Setup, integration: HORIZON-Chips-2024-RIA-CPL-5</li> <li>Operational: DIGITAL-Chips-2024-SG-CPL-5</li> </ul>	<p style="text-align: right;"><b><i>Max. EURO 180 Mio</i></b></p> <p style="text-align: center;"><b><i>Indicative EURO 100 Mio; Max EURO 130 Mio</i></b></p> <p style="text-align: center;"><b><i>Indicative EURO 70 Mio; Max EURO 100 Mio</i></b></p> <p style="text-align: center;"><b><i>Indicative EURO 10 Mio; Max EURO 30 Mio</i></b></p>
<b><i>Mode</i></b>	<b><i>Call for Pilot line (CPL)</i></b>
<b><i>Publication date</i></b>	<b><i>08 Jul 2024</i></b>
<b><i>Deadline Submission of proposals</i></b>	<b><i>17 September 2024 at 17:00 Brussels Time</i></b>

➤ EU expenditure matched by member state contributions



## APPENDIX 4: ACTIVITIES LAUNCHED IN 2024 FOR INITIATIVE PART

This call topic follows the four calls on pilot lines in 2023, and is dependent on the outcomes of those calls, i.e. the proposals submitted to those calls. This call topic aims to complement the set of pilot lines obtained in the four previous calls with one or more additional pilot lines, such as **for example a photonics pilot line**. Complementarity to the four pilot lines would be defined in terms of scope of technologies covered. The possibility of having this call topic is dependent on the budgetary situation, which itself will depend largely on the proposals submitted to the four calls on pilot lines in 2023.

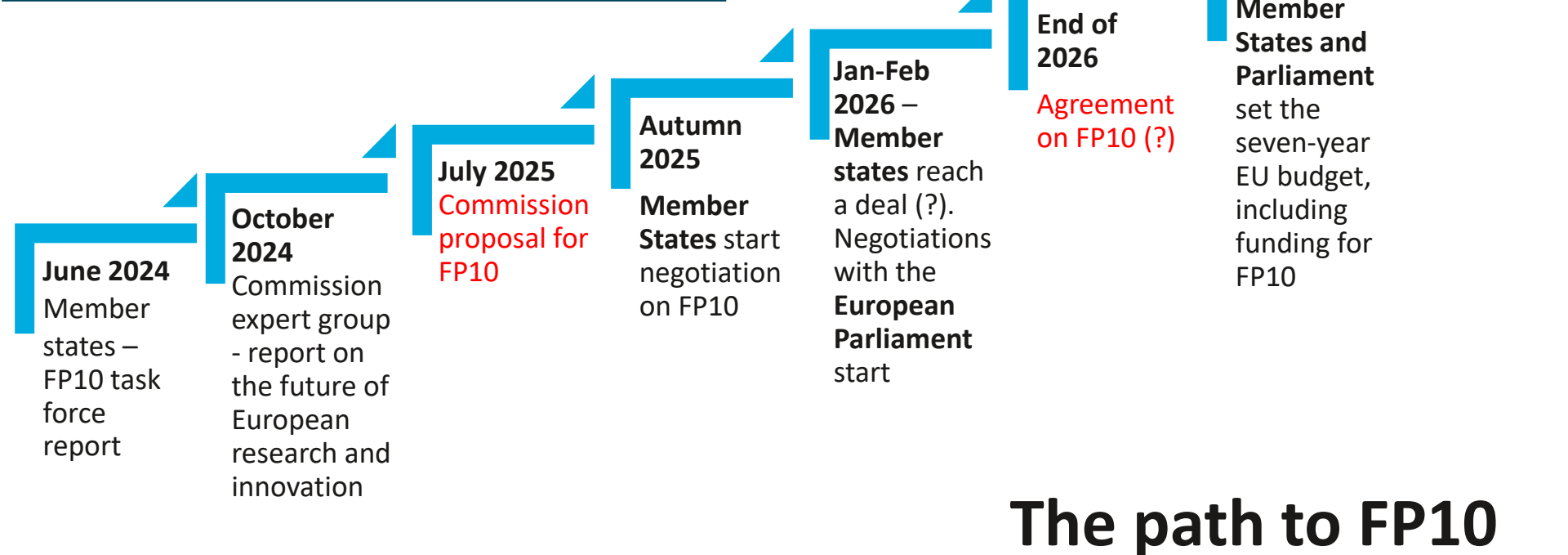
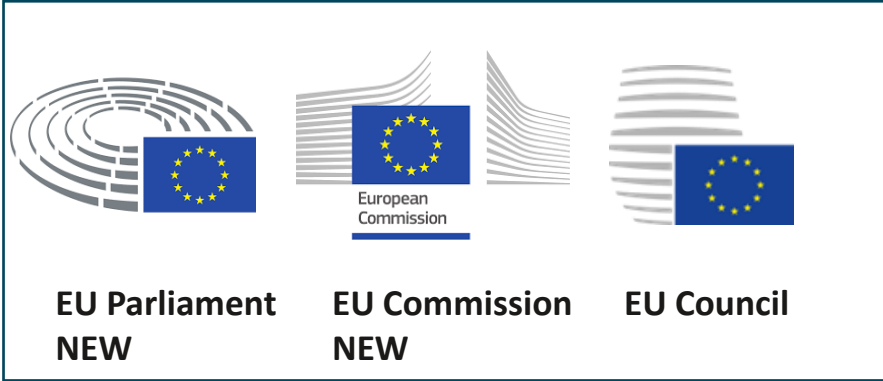
If feasible, the call topic will be further defined after the closure of the four calls on pilot lines. This will lead to an amendment of this Work Programme.

Source: [chips-ju.europa.eu](https://chips-ju.europa.eu)

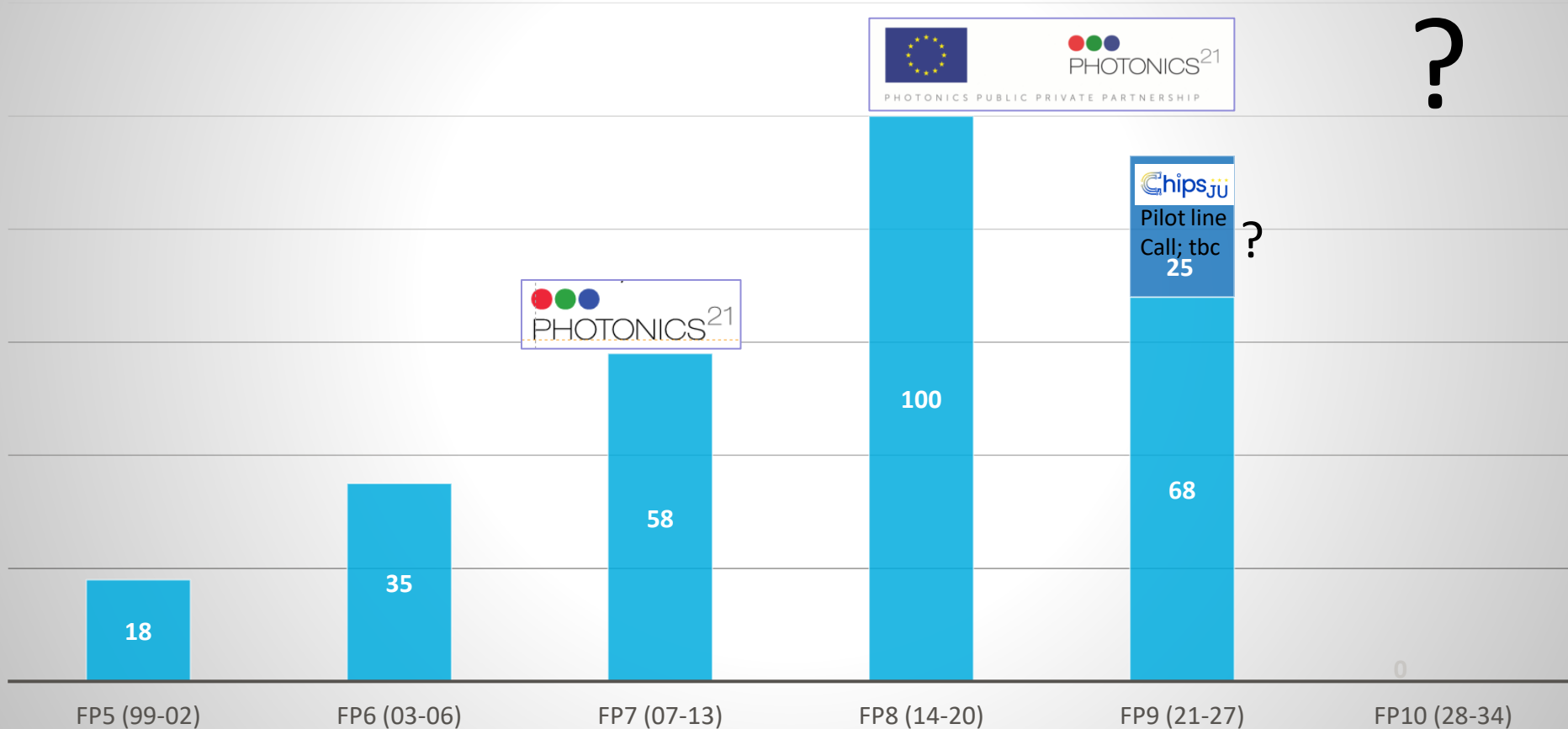
# Photonics in the 10th EU Framework Programme 2028-34



PHOTONICS<sup>21</sup>




# EU Commission funding for photonics in Framework Programmes (€mio/year) - estimates -



# Establishing a photonics priority / partnership in FP10?



- General: Tight national budgets, FP may no longer be a purely civilian programme (dual use), technology sovereignty remains priority
- Photonics squeezed between major FP10 policy initiatives - Chips (Integrated Photonics) & Quantum
- Strong advocacy work by the European photonics industry needed!

 European Commission	<b>Commissioner</b>
<b>New EU Commission</b>	Head of Cabinet and DG Connect Management

 EU Council	<b>MS Ministries</b>
	Head of Units and and State Secretary level

 New EU Parliament	<b>ITRE Committee</b>
	Companies located in the constituencies of Members of the EU Parliament

# Join the Photonics Partnership Annual Meeting 2024

## Shape the future of photonics in Europe!

### Photonics Partnership Annual Meeting 2024

14 – 15 May 2024

DoubleTree by Hilton Brussels City Hotel



PHOTONICS PUBLIC PRIVATE PARTNERSHIP



#### Why attend

- Be part of a high-level panel discussion "Quo Vadis Photonics?"
- Get information on funding opportunities in other European partnerships or initiatives
- Learn about the economic performance of photonics on a global scale
- Network and develop new ideas for future Photonics R&I projects

#### Register now!

Early bird rates and sponsoring opportunities available at [www.photonics21.org](http://www.photonics21.org)

# Thank you!

**Contact:** [secretariat@photonics21.org](mailto:secretariat@photonics21.org)

**Website:** [www.photonics21.org](http://www.photonics21.org)

**X / LinkedIn:** Photonics21



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