

THE EU RESEARCH AND INNOVATION PROGRAMME (2021-27)

HORIZON-CL4-2027-05-DIGITAL-EMERGING-03: Advanced integrated photonic devices for extended features and ultra-low power consumption (RIA) (Photonics Partnership)



HORIZON-CL4-2027-05-DIGITAL-EMERGING-03: “Advanced integrated photonic devices for extended features and ultra-low power consumption” (RIA)

Key facts

- RIA (TRL 3-6), single stage, lump sum. EUR 25M, EUR 3-5M per project, around 6 projects.
- Opens 17 November 2026, deadline 18 March 2027

1. Expected outcomes

- Advanced integrated photonic devices and circuits with enhanced functionality and performance
- Reinforced competitiveness of EU photonics actors, demonstrated in representative system configurations with validated real-world applicability
- Significantly improved performance of electro-optic systems in communication, computing, sensing, medical diagnostics, data processing and AI
- Low power consumption sensors with increased performance in application domains

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2. Scope: address at least two of the following aspects

- Enhanced performance: spectral purity, wavelength coverage, output power and noise characteristics
- Increased speeds: modulation or detection beyond existing PIC platforms, novel materials such as thin-film LiNbO₃, BTO, graphene, silicon carbide, phase change materials and TMDCs
- Miniaturisation and integration: high-complexity circuits, chiplets, scalable interconnects, electronics-photonics integration (co-packaged, heterogeneous or monolithic)
- Power reduction: electrical-to-optical conversion, lower optical losses, operation at higher temperatures, low-power actuation and control
- System-level impact, demonstrated in representative configurations for one or more application domains

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3. Which types of stakeholders are mainly addressed?

- Universities and RTOs in integrated photonics (devices, materials, circuits, integration)
- PIC foundries, design houses and packaging companies, including SMEs
- System integrators and end users who validate representative configurations in datacom, computing, sensing, health, automotive and security
- Consortia should ideally combine device developers with at least one system or application partner

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4. Future trends and emerging initiatives

- AI compute drives optical interconnects and co-packaged optics. The energy budget of data movement is the bottleneck this topic targets
- Silicon photonics is moving to 300 mm volume manufacturing, while new material platforms (thin-film LiNbO₃, BTO, 2D materials, SiC) reach foundry level
- Photonics named a transversal and enabling technology in the chips act revision, with a new operational objective on design, prototyping and industrial deployment capacities for photonic integrated circuits.
- Chips JU: co-packaged optics IA planned in WP 2027 (TRL 5-7), PIXEurope pilot line for prototyping and higher-TRL integration