

QUANTUM SYSTEMS: INTERCONNECTS AND INTEGRATED PHOTONICS TOPIC ANNOUNCEMENT FOR THE NSF X-LABS INITIATIVE

1.0 Purpose:

The National Science Foundation (NSF) Directorate for Technology, Innovation and Partnerships (TIP) announces its intent to solicit Written Proposals for NSF X-Labs teams in the technical domain of quantum interconnects and integrated quantum photonics. This NSF X-Labs announcement is issued under the Other Transactions Agreement Solutions Offering (OTASO), *NSF-OTASO-FY26-XLabsInitiative*.

2.0 The NSF X-Labs Initiative:

NSF X-Labs represent a bold, flexible, and outcomes-driven initiative designed to build and accelerate novel platform technologies capable of unlocking entirely new sectors, including new fields of scientific inquiry. The program will support full-time research and development (R&D) teams focused on use-inspired scientific breakthroughs and foundational platform technologies that traditional university and industry labs cannot easily address. NSF X-Labs teams will benefit from ambitious R&D goals, operational autonomy, milestone-based funding, and the ability to engage across academia, industry, national laboratories, and nonprofit sectors. NSF X-Labs will bet on ambitious, full-time teams working with urgency and purpose, and provide them with the structure, resources, and flexibility necessary to cultivate early-stage platform technologies that will accelerate breakthroughs and unlock entirely new sectors of the economy.

See Section 3 of *NSF-OTASO-FY26-XLabsInitiative* or the latest amendment issued for information on the NSF X-Labs initiative's strategic objectives.

2.1 NSF X-Labs Topics and Missions

NSF will release specific Topic areas under the NSF X-Labs initiative via Topic Announcements. Topics will center on fields of research where breakthroughs could create or reshape entire scientific fields and technology sectors where U.S. competitiveness is a priority.

Proposing teams will specify their Mission, defined as the novel platform technology and key use-inspired research solutions that the proposed NSF X-Lab is uniquely suited to tackle. Missions must align with a current Topic Announcement released by NSF. Proposing teams should have a clear vision of how their Mission will result in an end-state that creates or reshapes an entire field of scientific research or sector of technology, and how their Mission is currently unmet by existing organizational structures and funding mechanisms.

3.0 Topic Description:

Quantum computing and quantum information processing systems sit at the cusp of a watershed moment: through years of federally funded foundational discovery in quantum phenomena coupled with more recent industry investment in the buildout of quantum components and systems, the world is about to witness a new era in modern computation. Future quantum computing is expected to rapidly accelerate scientific discovery and use-driven applications in a

range of technology sectors, while unlocking entirely new frontiers beyond the reach of classical computing. But to realize future functional and connected quantum systems will require further investment in foundational platform technologies centered on quantum interconnects and integrated quantum photonics, which will be key enablers to combine different quantum capabilities into a single system.

Future quantum systems are expected to rely on interconnects to transfer quantum information – coherence and entanglement – between discrete physical subsystems. Quantum photonic technologies that utilize photons as robust carriers of quantum information in distributed architectures offer a compelling pathway toward scalable quantum computing, sensing and metrology, and networking. Integrated quantum photonics will further extend this capacity by enabling dense integration of optical components (e.g., entangled sources, interferometers, filters, switches, and detectors) onto compact chips and packages.

NSF X-Labs in this Topic will focus on the research and development of technologies to enable next-generation quantum interconnects, integrated quantum photonics and/or their supporting technologies. NSF X-Labs teams will target specific platform technologies that, if successful, will provide a roadmap for the integration of second-generation quantum systems. Examples of relevant, currently unmet R&D challenges may include, but are not limited to: scalable modular architectures based on the interconnection of discrete processing units; interconnection of heterogeneous quantum sub-systems via quantum transducers; reconfigurable quantum photonic circuits for compact multi-qubit operations; and next-generation quantum light sources, low-loss waveguides, and integrated single-photon detectors. NSF X-Labs in this Topic will aim to develop foundational platform solutions that can form the basis for broad industry adoption and integrated, system-level capabilities.

An NSF X-Labs Mission in this Topic must be transformative, accelerating breakthrough R&D in quantum technologies towards creating or reshaping new lines of research and technologies. Successful teams will develop platform technologies, overcome technical barriers facing quantum systems, demonstrate measurable impact on the U.S. science and technology landscape, and position their technologies for widespread use and investment.

Examples of challenges **not** considered in scope for this Topic include computational or software solutions without practical integration into a quantum system, solutions that are inherently unsuitable for future scaling and commercial adoption, development of technologies where the impact is narrow and not widely deployable, fundamental research without potential for application in platform technologies, incremental advancement of the state-of-the-art, or advancement of technologies that are already appropriately developed to the point of full-scale commercialization.

4.0 Other Transaction (OT) Award Details:

In response to this Topic Announcement, NSF anticipates issuing one or more Other Transaction (OT) contracts pursuant to NSF's statutory authority at 42 U.S.C. § 19116. Refer to *NSF-OTASO-FY26-XLabsInitiative* or latest amendment issued for more information on period and place of performance, instrument and approach, eligibility, performance objectives for NSF X-

Labs teams, programmatic phase structure, milestones and milestone-based payments, Written Proposal format and instructions, Oral Proposal Packages, NSF selection criteria, and the review and selection process. Proposers are expected to closely review *NSF-OTASO-FY26-XLabsInitiative* before submitting a Written Proposal in response to this Topic Announcement.

An eligible organization can submit a maximum of two Written Proposals per Topic Announcement for Phase 0 as a lead organization. Senior/Key Personnel may be listed on a maximum of one Written Proposal per Topic Announcement.

5.0 Topic Timeline:

NSF anticipates awarding selected teams a 9-month Phase 0 with a Go/No Go selection period beginning after 7 months. NSF anticipates awarding teams selected for Phase 1 an approximately 24 to 36 month period of performance with the intention of renewing high performing teams for Phase 2 following subsequent Go/No Go selections.

NSF anticipates the following schedule for OT awards made in response to this Topic Announcement:

Written Proposal Submission Deadline	July 24, 2026; 5:00 p.m. Eastern
Oral Presentations	August 31 to September 4, 2026
Beginning of Phase 0	December 2026
Beginning of Phase 1 Go/No Go Selection	July 2027
Beginning of Phase 1	September 2027

6.0 Submission Details:

The NSF X-Labs initiative involves a two-step competitive evaluation, as described in *NSF-OTASO-FY26-XLabsInitiative*. NSF will accept Written Proposals in response to this Topic Announcement and then invite a smaller number of proposing teams to submit an Oral Proposal Package and deliver an oral presentation. All Written Proposals submitted in response to this notice must comply with the content and format described in Section 10 of *NSF-OTASO-FY26-XLabsInitiative* or the latest amendment issued.

Questions concerning this Topic Announcement may be accepted by the Government through 5:00 p.m. Eastern on July 17, 2026. Questions must be submitted via email to XLabs@nsf.gov. The subject line of any submitted questions must include the topic title: NSF-Topic1-FY26-XLabsQuantumSystems.

Written Proposals will not be accepted after **5:00 p.m. Eastern on July 24, 2026**. Proposals must be submitted electronically via the NSF submission website at <https://nsfgov.my.site.com/xlabs>.

7.0 Quantum Systems: Interconnects and Integrated Photonics NSF X-Labs Webinars:

Join the NSF TIP team for a webinar, including a presentation on key materials in the OTASO and Topic Announcement. A Q&A will follow the presentation. Respondents are recommended to review *NSF-OTASO-FY26-XLabsInitiative* and the Topic Announcement before the webinar to maximize the effectiveness of the Q&A session.

Introduction to NSF X-Labs Funding Opportunity - Quantum Systems: Interconnects and Integrated Photonics

June 4, 2026, 2:00 p.m. - 3:00 p.m. Eastern

Register here: https://nsf.zoomgov.com/webinar/register/WN_QkYByJ7BTi29CzLJBmBDSQ

Q&A for NSF X-Labs - Quantum Systems: Interconnects and Integrated Photonics

June 30, 2026, 2:00 p.m. - 3:00 p.m. Eastern

Register here: https://nsf.zoomgov.com/webinar/register/WN_XAuPCi_lS8m5VXlev2zRWA