

INtensity-Squeezed Photonic Integration for Revolutionary Detectors (INSPIRED) Proposer's Day

Mark Rosker, MTO Director

Briefing prepared for INSPIRED Proposer's Day

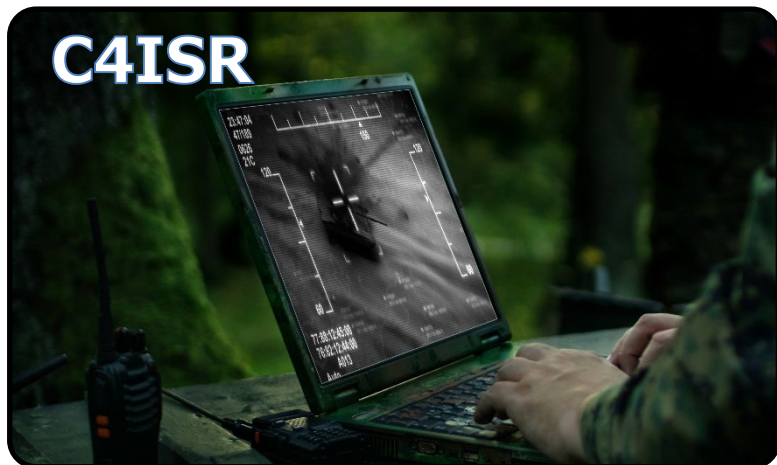
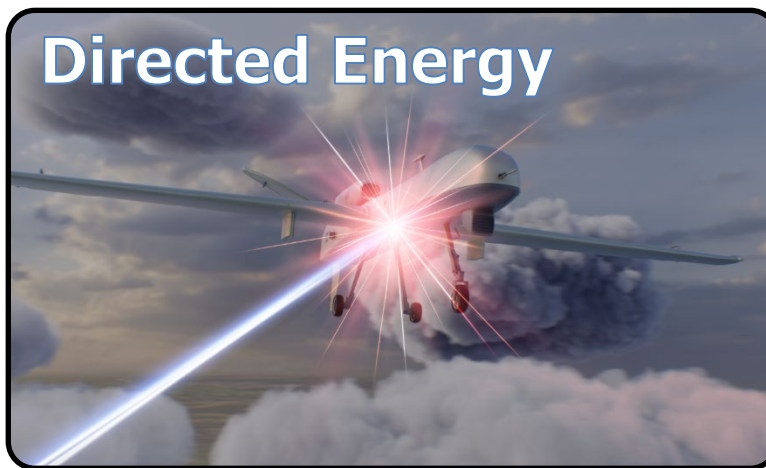
22 September 2023





Our mission

High-performance, intelligent microsystems and next-generation components



C4ISR: Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance

PNT: Positioning, Navigation, and Timing

Approved For Public Release; Distribution Unlimited

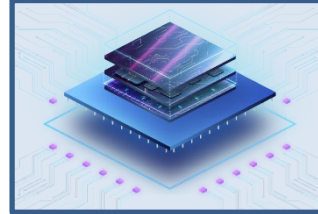


Electronics Resurgence Initiative (ERI) 2.0 timeline

NGMM Phase 0 BAA
August 2022



ERI Summit 2023
August 22-24 / Seattle, WA



Securing communications

TALK



Increasing information processing efficiency at the edge

COMPUTE



Accelerating innovation in AI hardware

DECIDE



Manufacturing complex 3D microsystems

BUILD



Optimizing design and test for complex circuits

COMPOSE



Overcoming security threats across the entire hardware lifecycle

SECURE



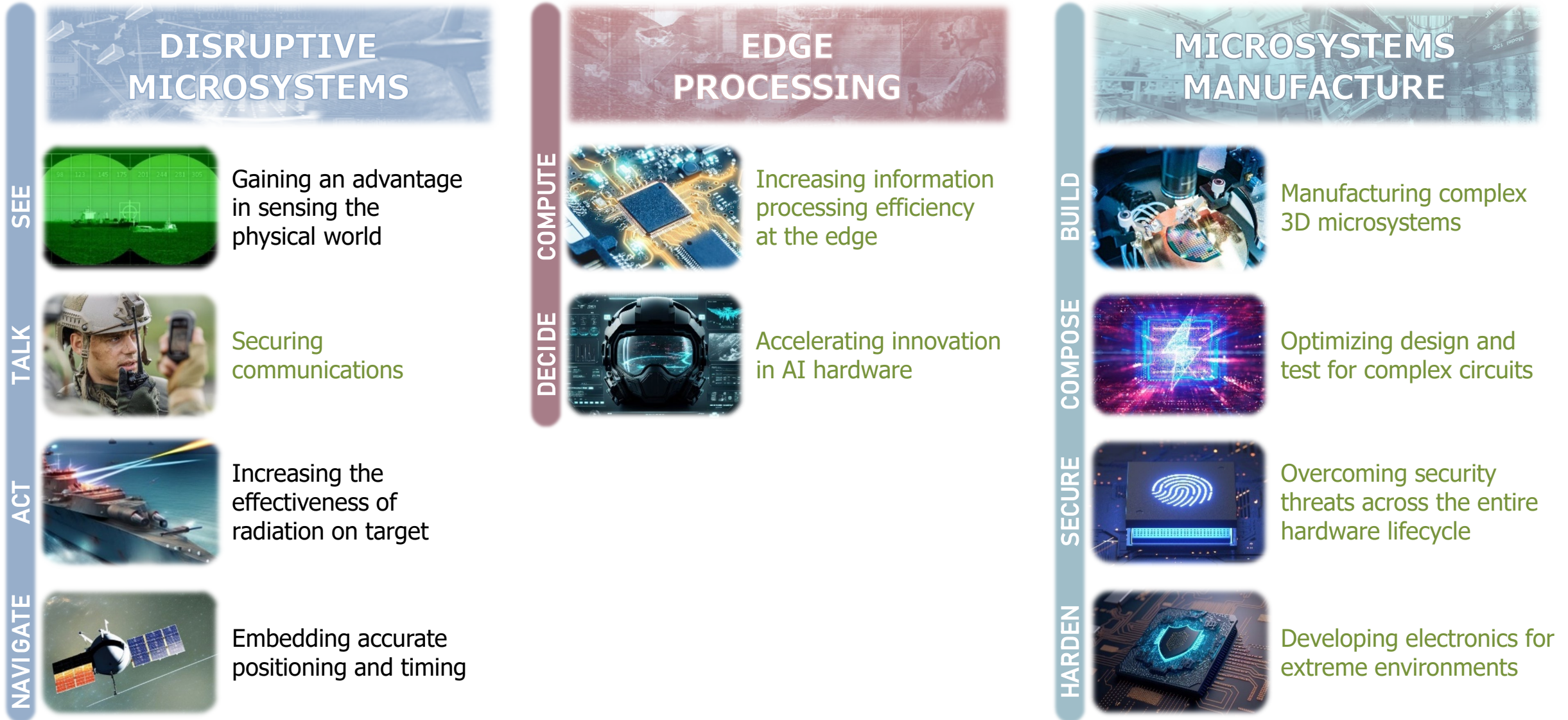
Developing electronics for extreme environments

HARDEN



MTO thrust areas

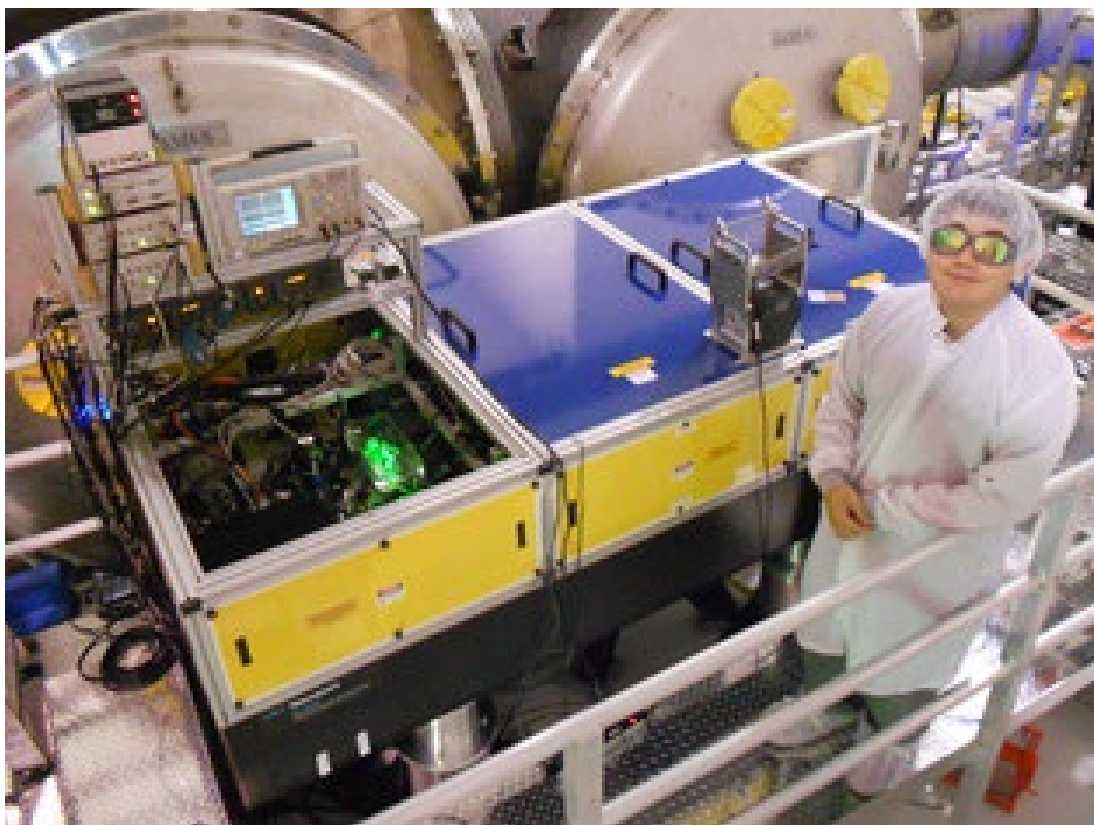
Electronics Resurgence Initiative (ERI)



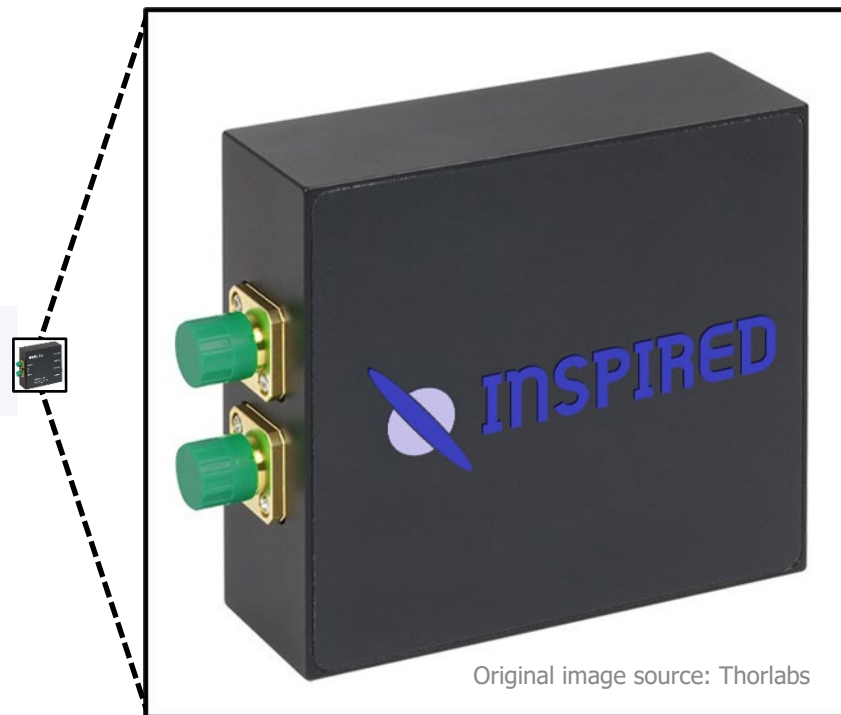


Intensity-Squeezed Photonic Integration for Revolutionary Detectors (INSPIRED)

INSPIRED will develop chip-scale optical detectors that surpass the quantum limit in sensitivity by 40x



Source: LIGO



Original image source: Thorlabs



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Intensity-Squeezed Photonic Integration for Revolutionary Detectors (INSPIRED)

Justin Cohen
Program Manager, DARPA MTO



Proposers Day
September 22, 2023



**Slides 1-24 contain updates
reflecting changes made to the
INSPIRED BAA in Amendment 1.**

**Slides 25-48 contain the
presentation as originally given at
Proposers Day.**



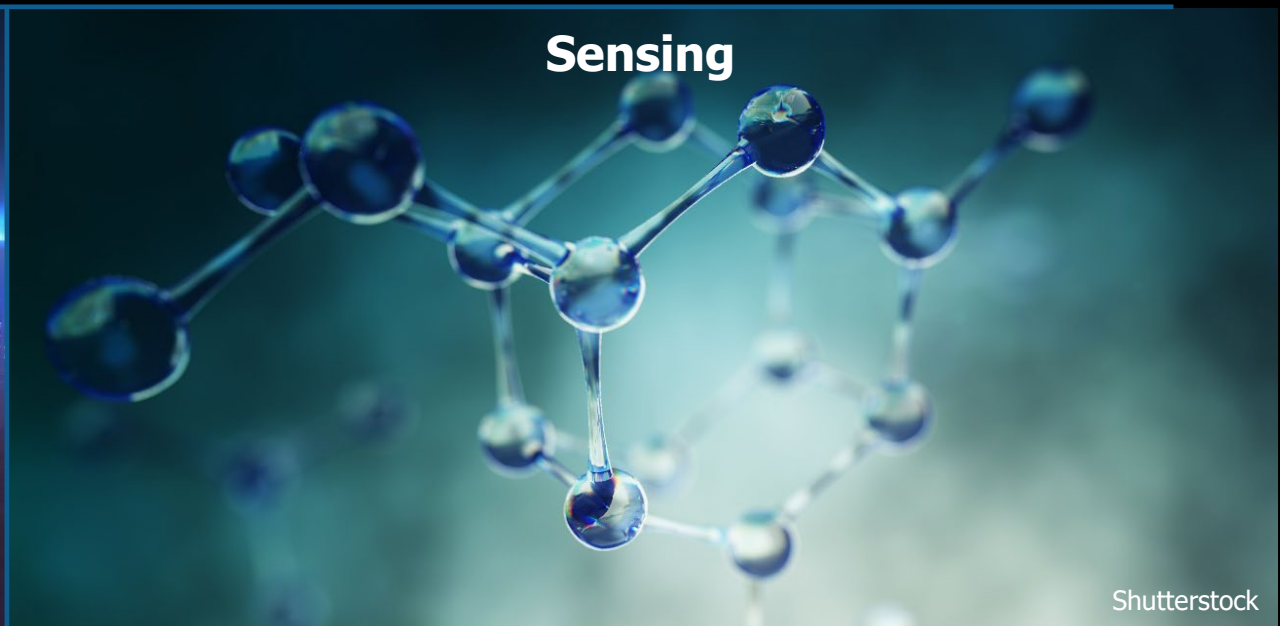
Sensitive Detectors Are Vital Components



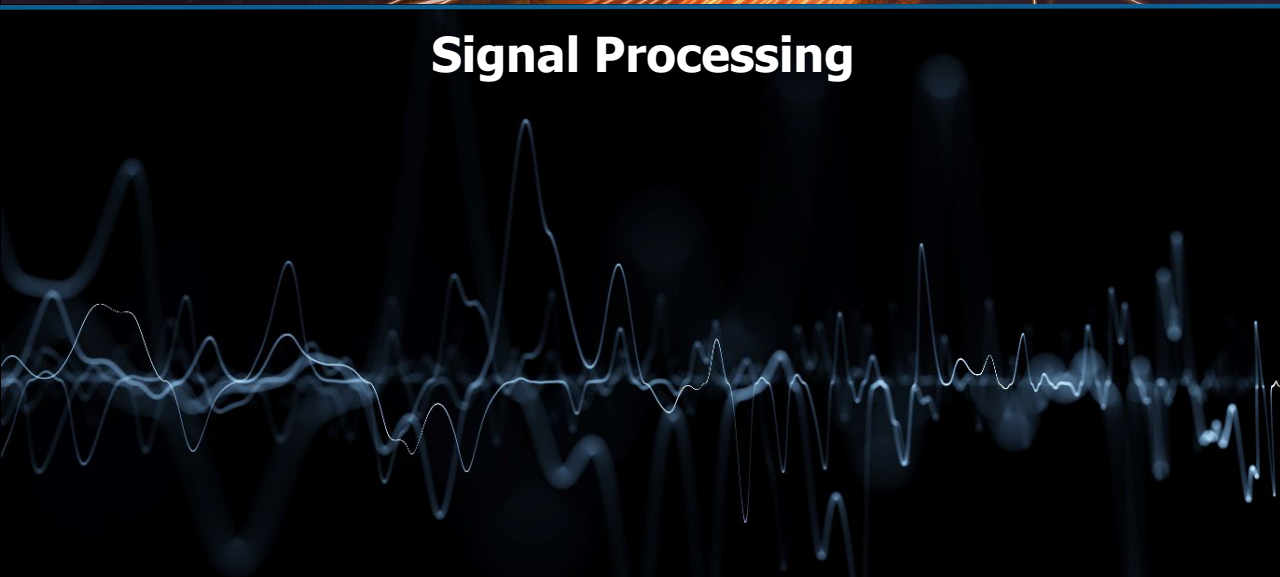
Communications



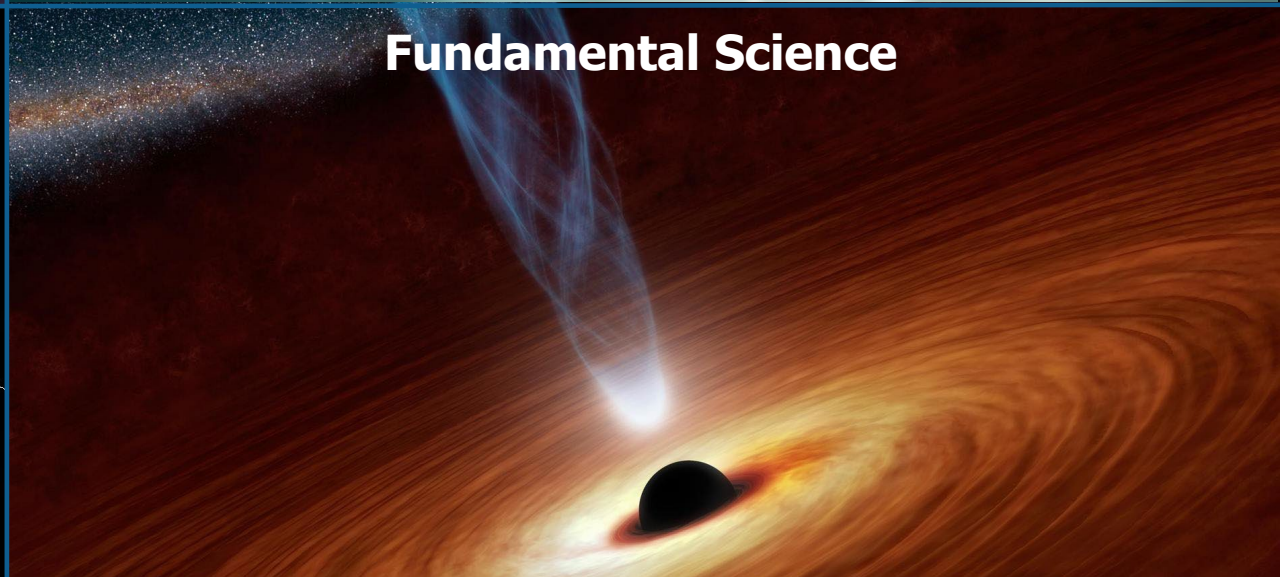
Sensing



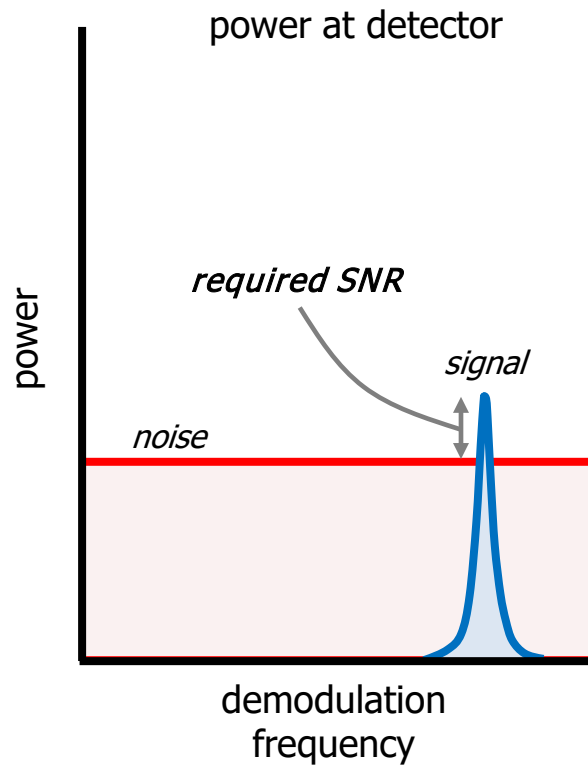
Signal Processing



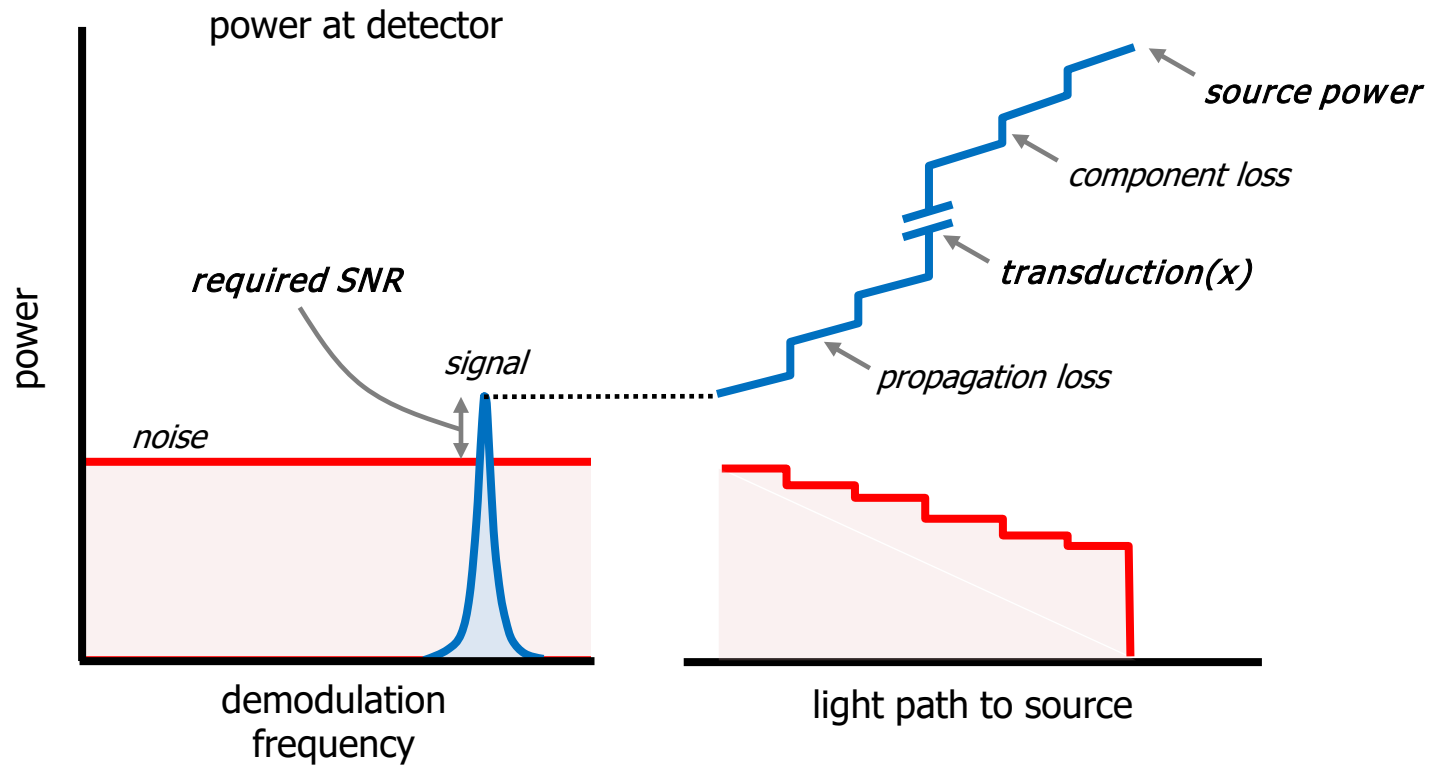
Fundamental Science



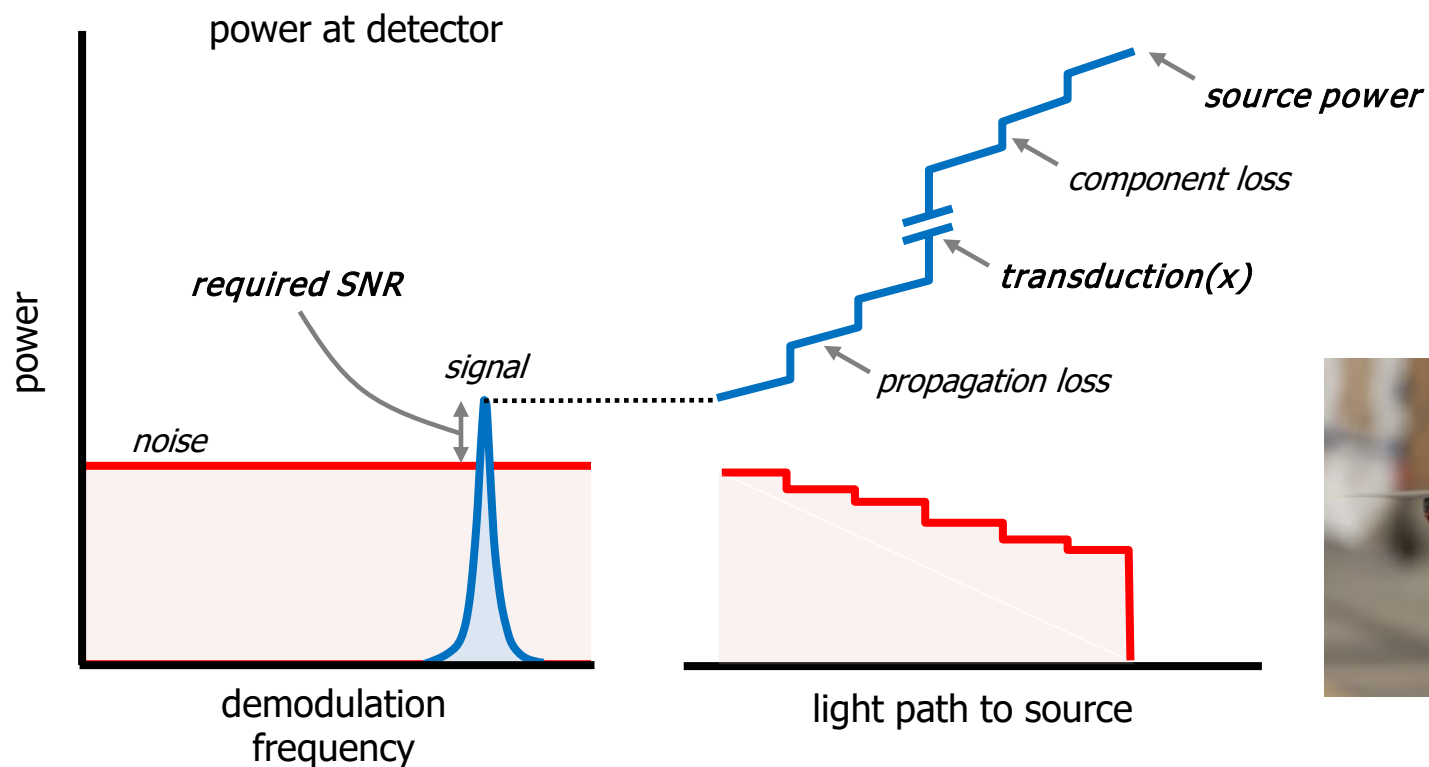
Detector sensitivity dictates system-level design.



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Detector sensitivity dictates system-level design.



Scaling system performance usually means increasing power and size...



DARPA

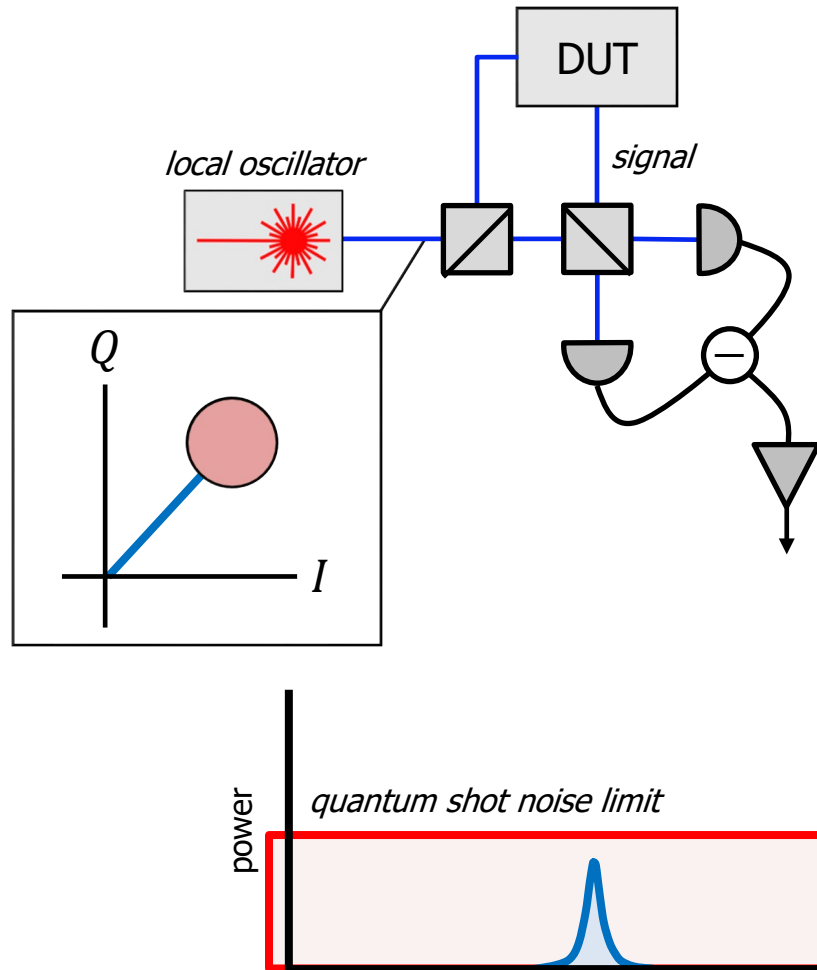


DARPA

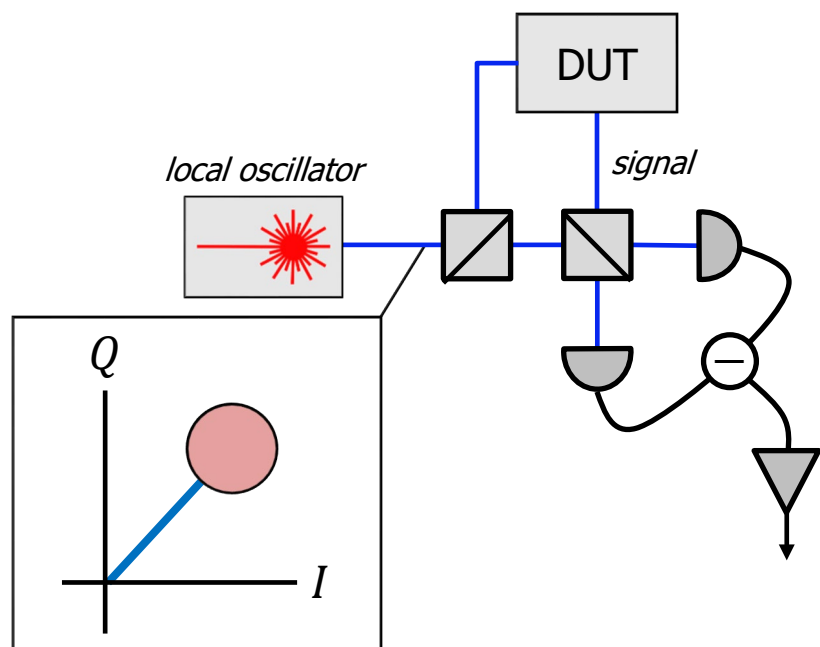
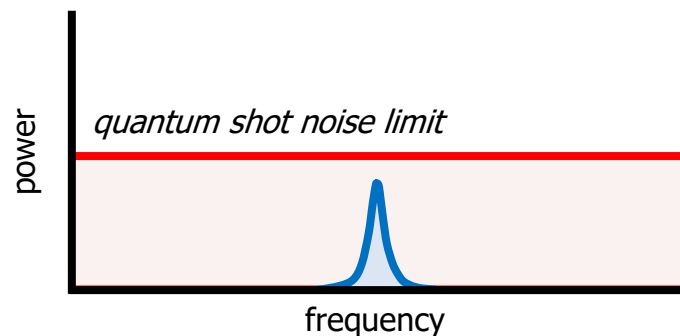


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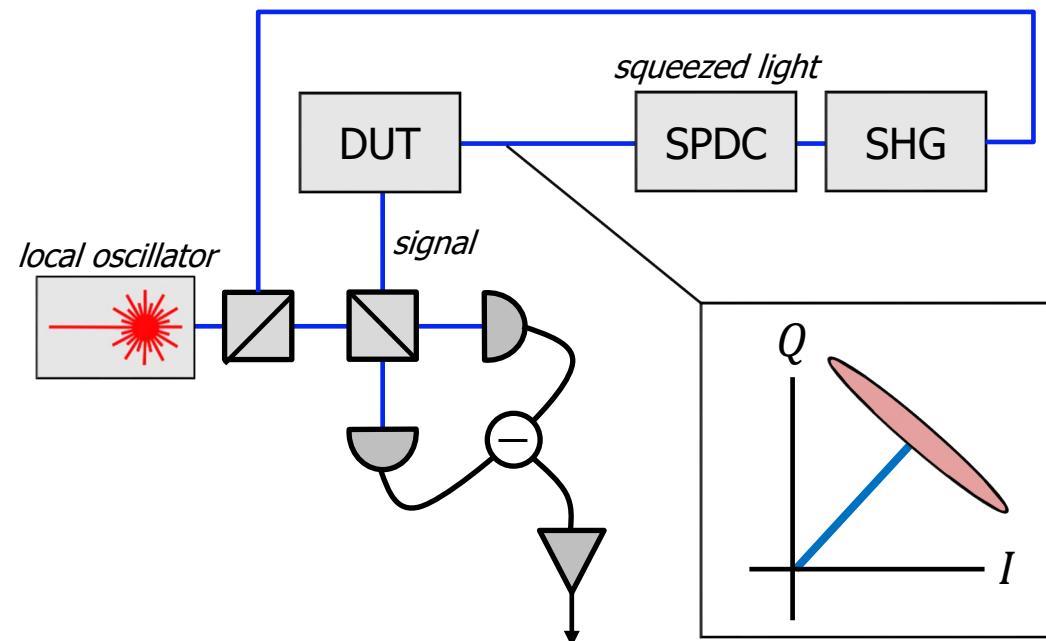
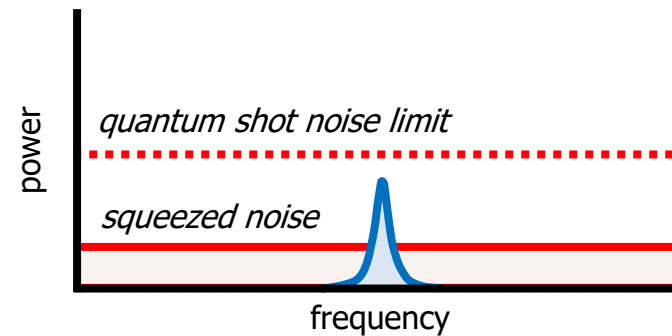
Homodyne Detector (simplified)

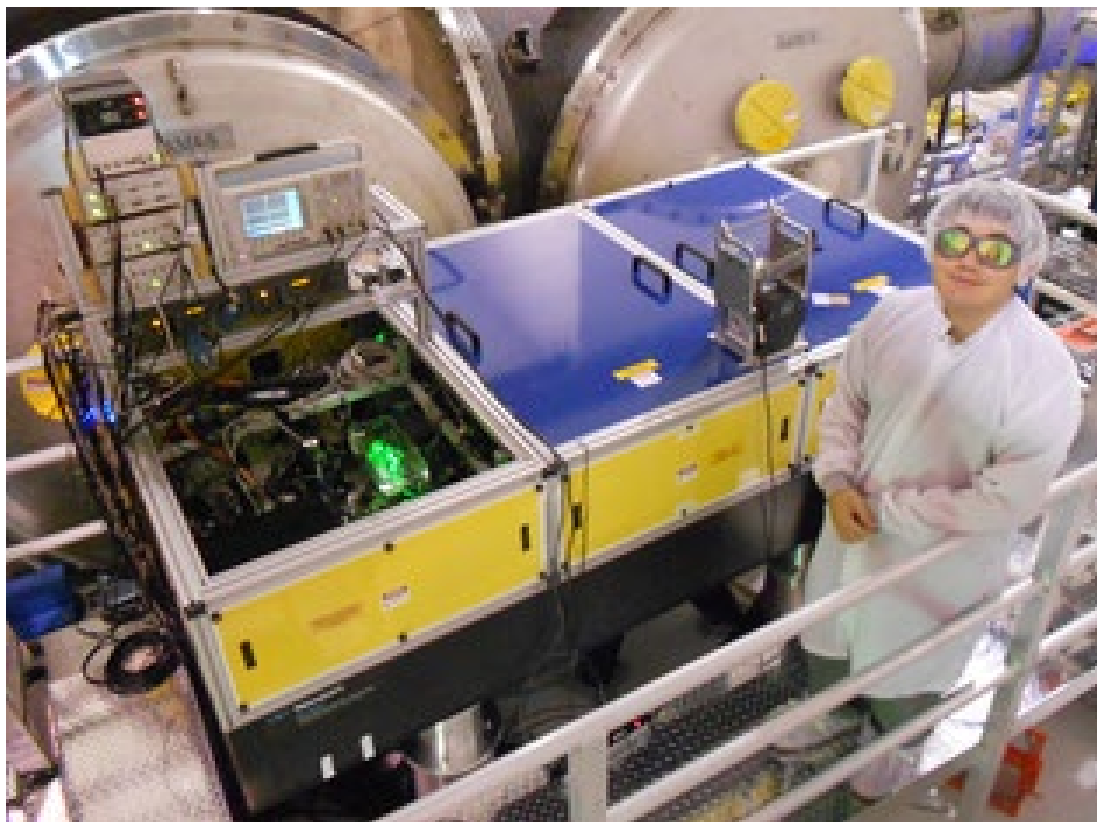


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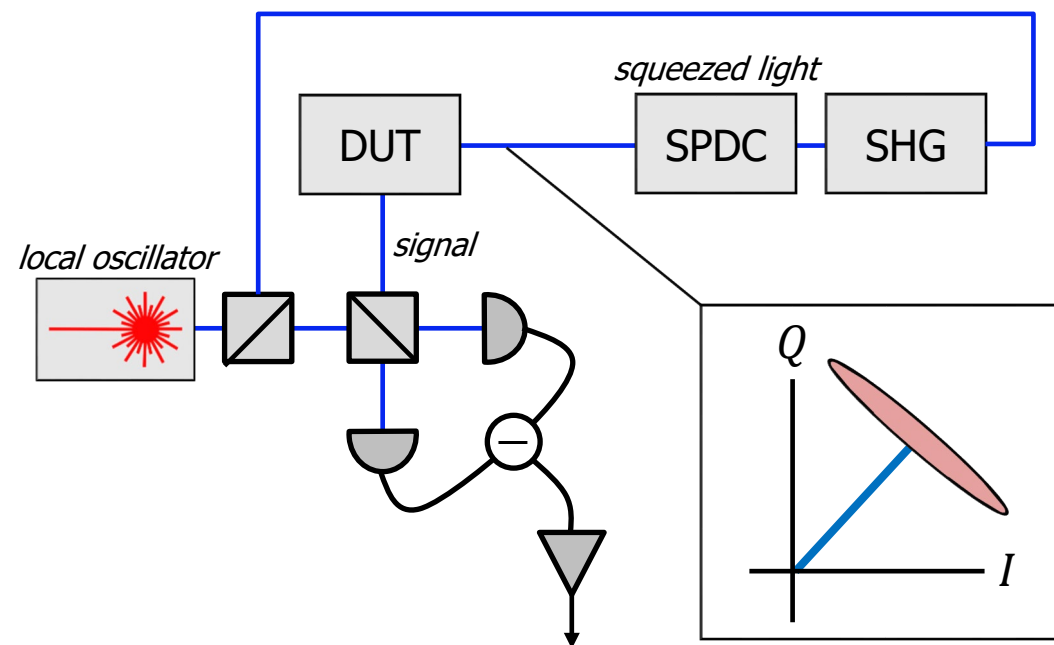
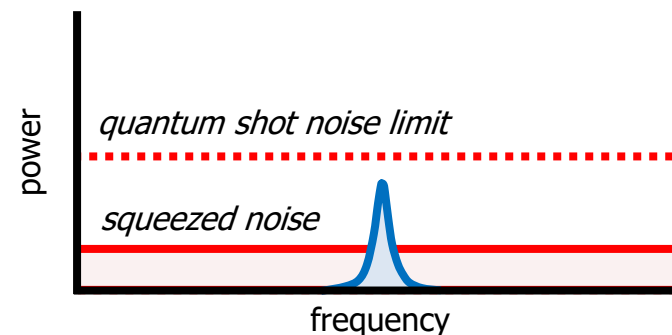
Squeezed-Light Detector (simplified artist rendition)

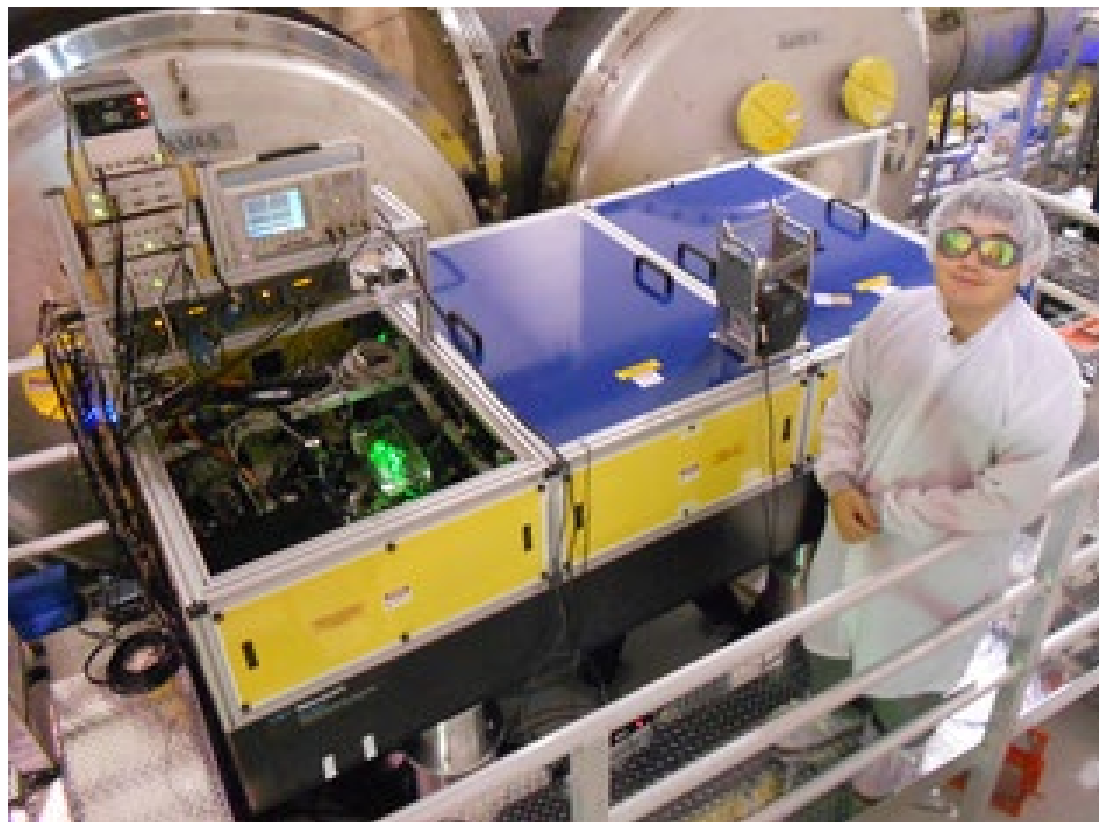




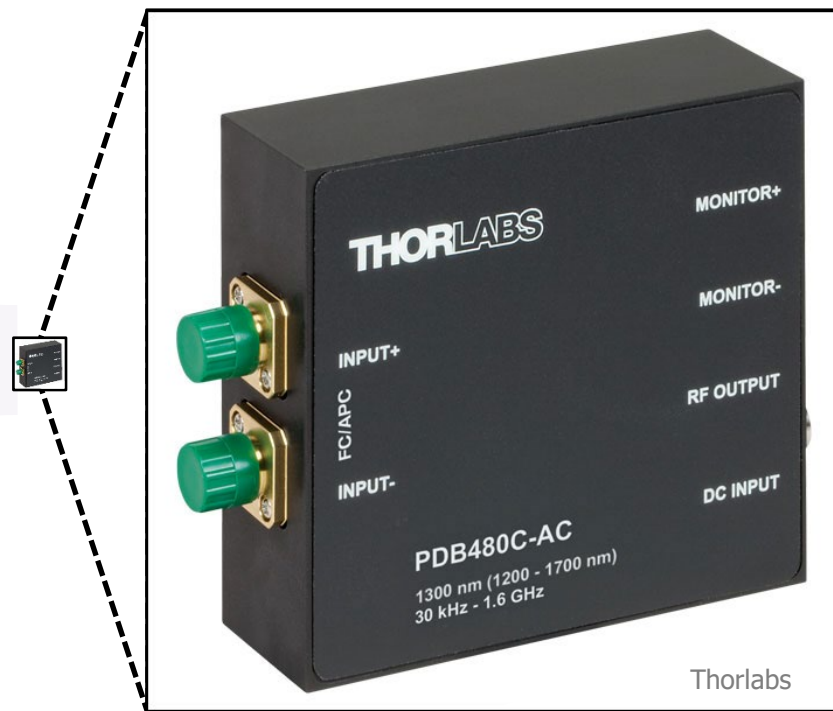
LIGO

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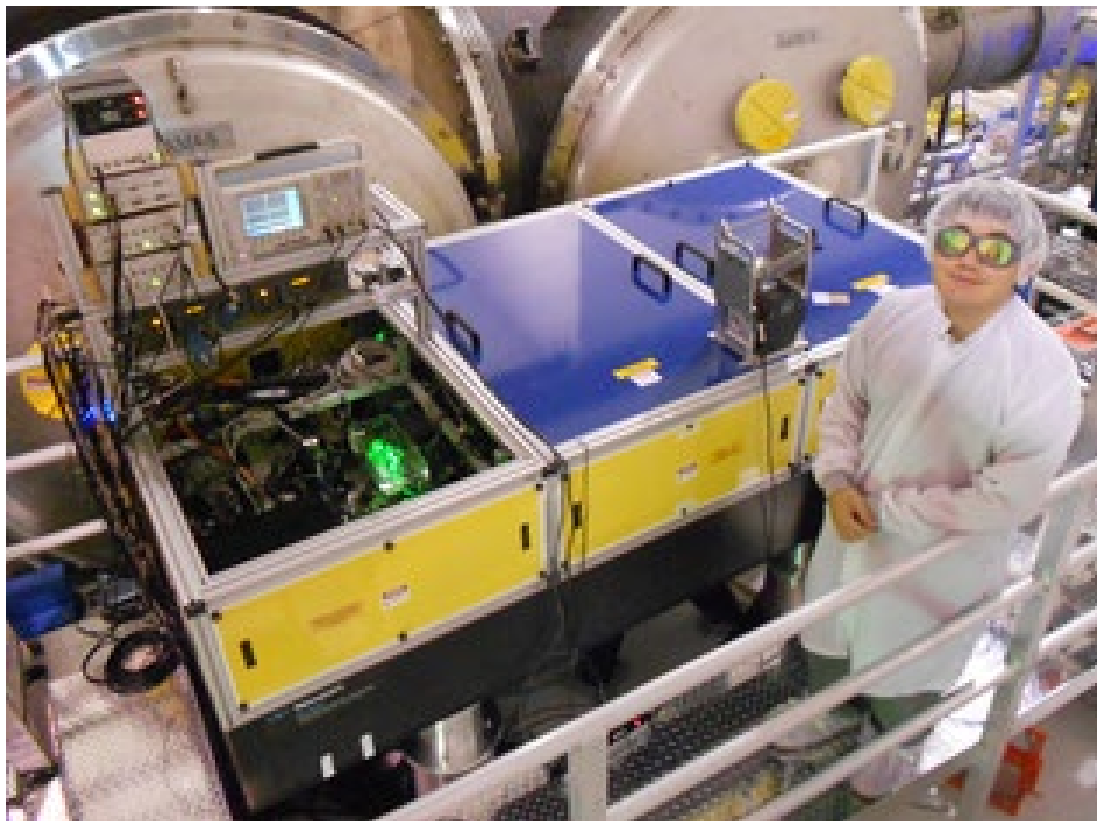




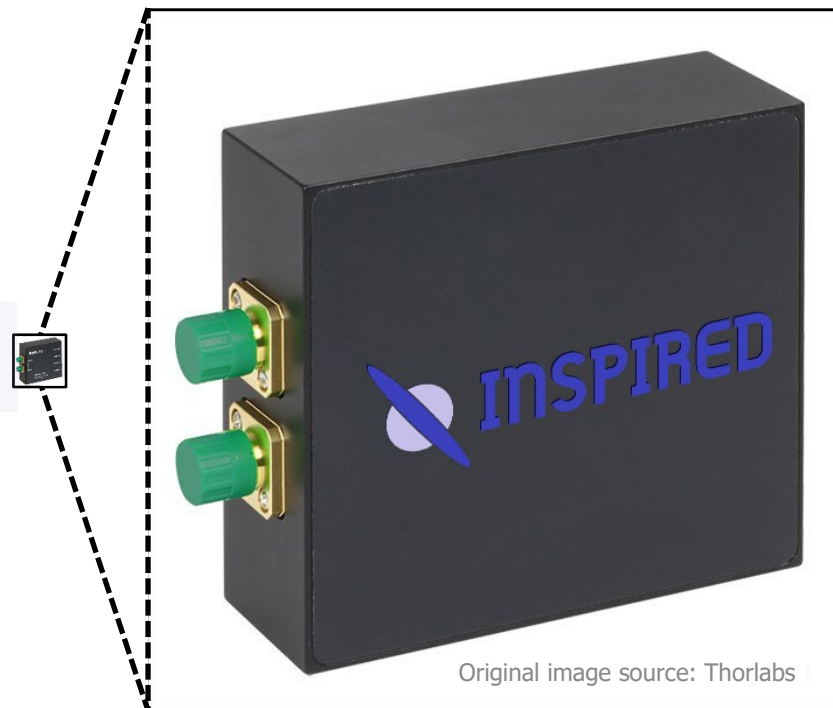
LIGO



Thorlabs

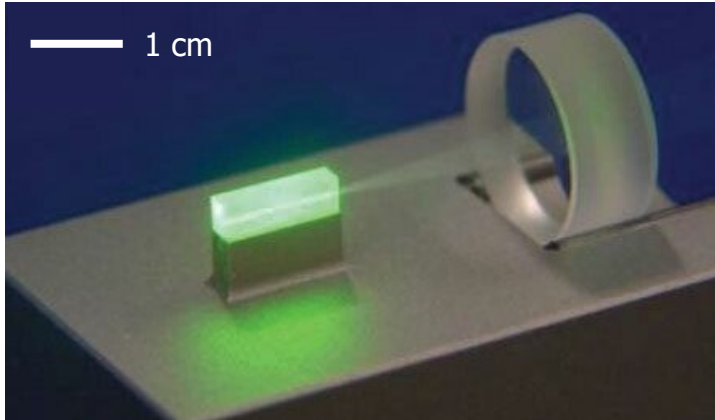


LIGO

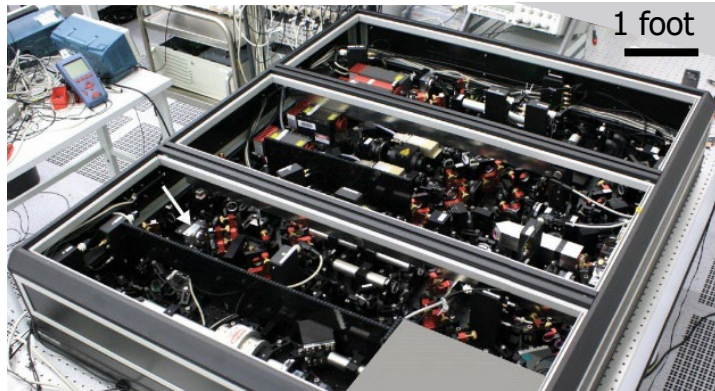


Original image source: Thorlabs

Discrete Optics

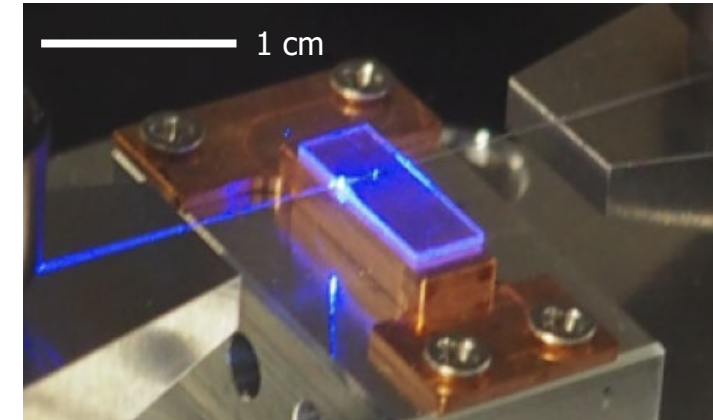


Schnabel, *Phys. Today*, 2022: GEO 600

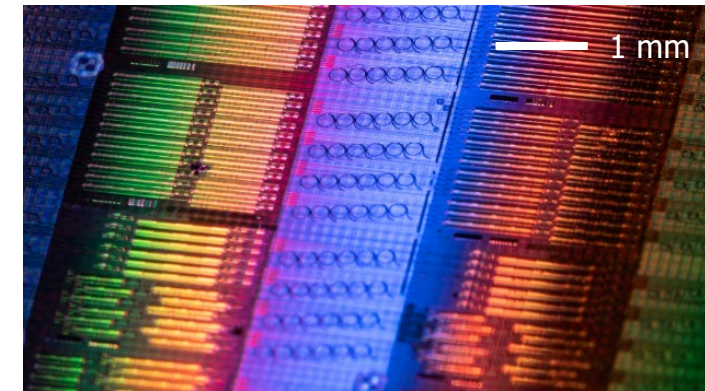


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Integrated Photonics



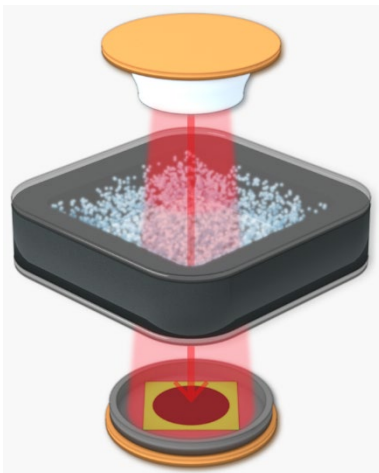
Stanford: DARPA LUMOS



UC Santa Barbara: DARPA LUMOS

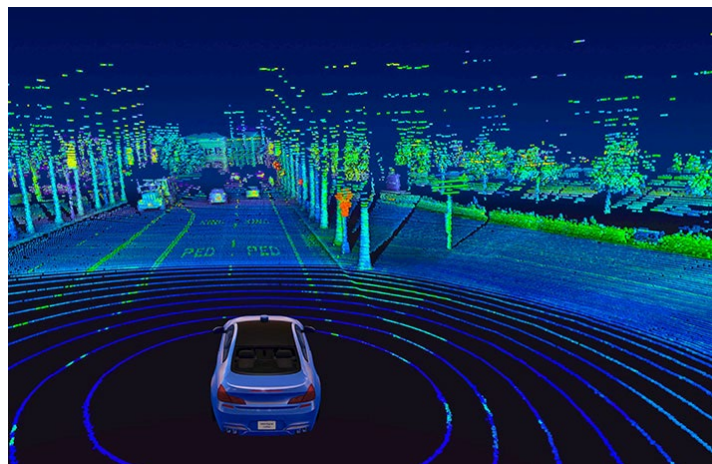
Hypothesis: Chip-scale components can outperform discrete optics in surpassing the quantum noise limit

Atomic Sensing



NIST

Remote Sensing



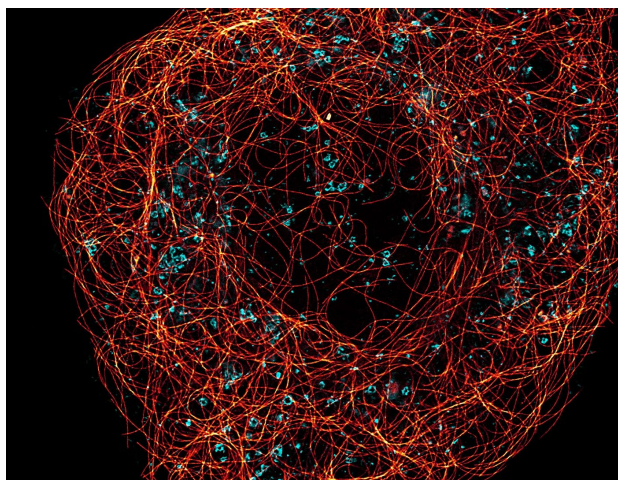
Velodyne

Inertial Sensing



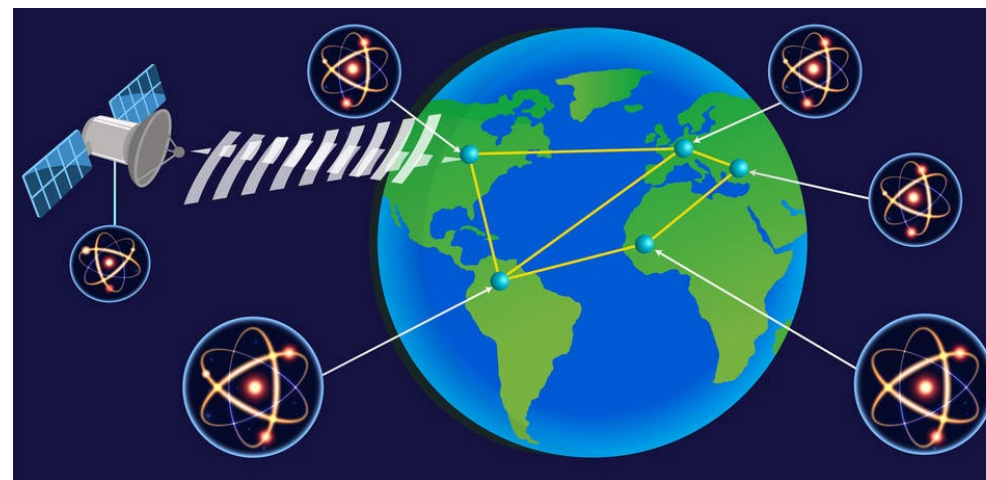
Honeywell

Biological Sensing



Leica

Quantum Computing and Networking



NIST

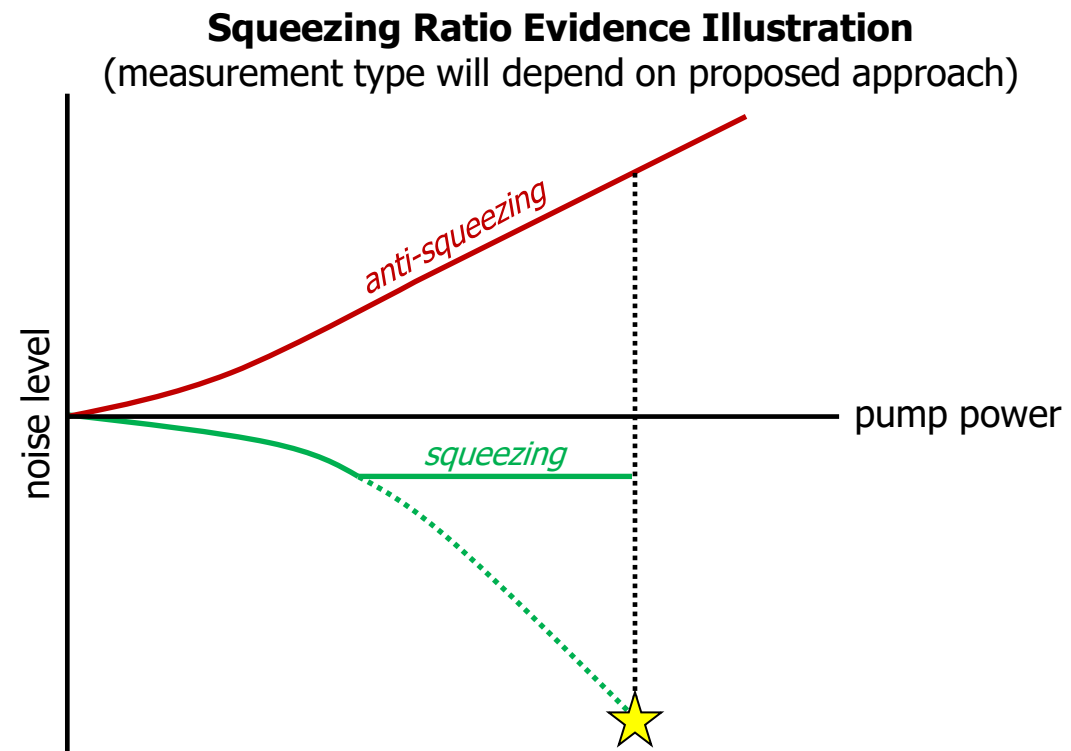


INSPIRED Test Article	Metric	Unit	Phase 1	Phase 2
Squeezed-Light Generator	Squeezing Ratio	dB	16	-
Interferometer Circuit	Aggregate Optical Loss	dB	0.1	-
Integrated Squeezed-Light Detector	Sensitivity	zW/Hz	-	10
	Volume	cm ³	-	100

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May be met by:

- Direct squeezed quadrature measurement, and
- Extrapolation of anti-squeezed quadrature measurement,
- Consistent with noise model.



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Loss: Including all losses encountered by squeezed light in the Interferometer Circuit

- Can exclude photodetector quantum efficiency in Phase 1

Phase sensitivity: Interferometer must lock to any quadrature across 2π radians to a precision of 10 mrad

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Assumes vacuum-squeezed homodyne detection

- Sensitivity calculated as version of Noise Equivalent Power for homodyne:
 - One-sided noise power spectral density divided by the local oscillator power
- Commensurate with 16 dB of noise reduction from the shot-noise limit
 - $(2hc)/\lambda \times 10^{-1.6} \approx 10$ zW per Hz of bandwidth
- May be demonstrated by showing 16 dB of noise reduction from shot noise

Alternative approaches are allowed

Operating wavelength within 5% of 1064 nm, 1300 nm, or 1550 nm

- Scale the 10 zW/Hz sensitivity metric by factor of $1064/\lambda$

Bandwidth spanning from 10 kHz to 10 GHz with output achieving:

- Sensitivity metric at any frequency in the band and with performer defined bandwidth
- Shot-noise limited by LO power at all other frequencies in the band



Original image source: Thorlabs

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In the box:

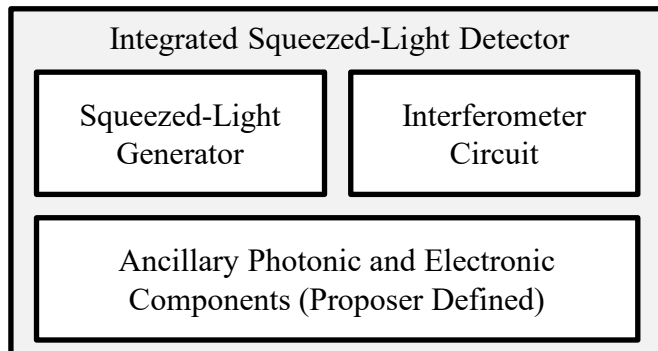
- All optoelectronic components needed to perform measurement at sensitivity metric

Inputs and outputs:

- Optical: common fiber or a free space modes of standard lab equipment
- Electrical: standard connectors, can include multiple output ports to span spectrum and control the module

Optical Inputs/Outputs

local oscillator
and pump
→
signal
(optional)
↔

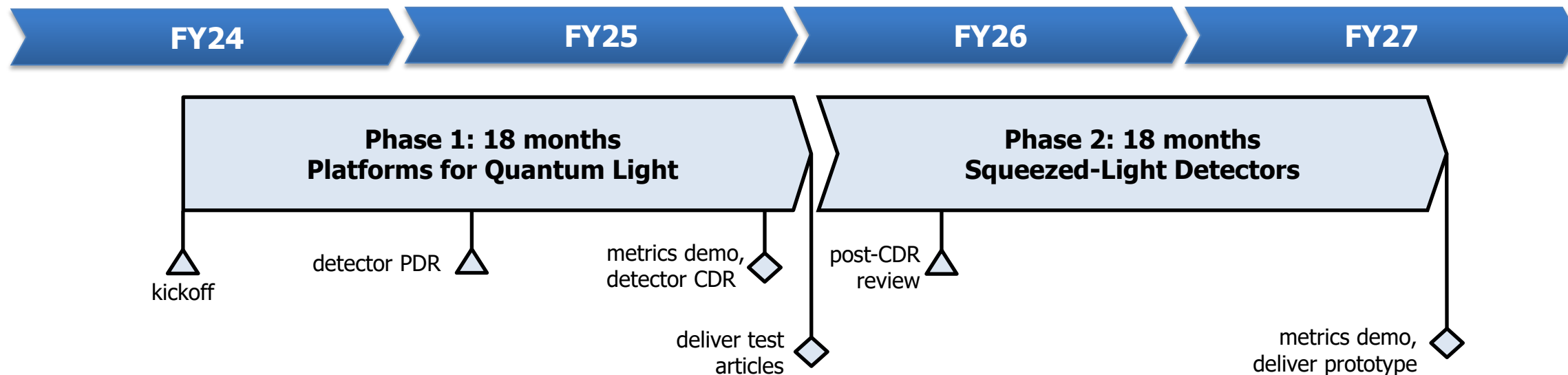


Electrical Inputs/Outputs

← power supply
and control(s)
10 kHz – 10 GHz
output(s) →



Original image source: Thorlabs



• Financial Details

- Base (Phase 1) + Option (Phase 2)
- 6.2 Funding
- Multiple awards

• Major Goals and Outcomes

- Phase 1 – Develop the central chip-scale photonic devices required for a squeezed-light detector
- Phase 2 – Deliver compact squeezed-light detector prototype with sensitivity exceeding the quantum limit



- Realizing **chip-scale photonic devices** and **circuits** that can efficiently **prepare, manipulate, and detect quantum states of light**
- Achieving **low aggregate loss** in complex, **multi-component circuits**
- Generating a **high squeezing ratio** in **size- and power-constrained devices**
- Maintaining **stable optical phase**
- Mitigating **classical noise**

Meeting the challenges...

- Likely entails broad innovation in **materials, design, and fabrication**
- **Any approach** that demonstrates a **credible path** to satisfying all metrics and goals stated herein **will be considered for selection**



- Response to all program **metrics**, **milestones**, and **deliverables** stated in the BAA
- The **method of squeezed-light generation and signal detection** based on chip-scale photonic components
- **Constructive plan** to demonstrate the test articles
- **List of the expected ancillary components**, both photonic and electronic
- Technical approach **elements that support meeting metrics**
- **Evidence** that these elements can be achieved
 - **Calculations** based on empirical parameters, **simulations**, or initial related **experiments**
- Other **technical noise sources**, **loss sources**, and **stray light sources** specific to the proposed approach, and plans to mitigate. For example:
 - **Resonator losses** inherent in extracting squeezed light from a cavity
 - **Technical laser noise**
 - **Amplifier noise** in balanced photodetectors



1. Overall Scientific and Technical Merit

- The proposed technical approach is innovative, feasible, achievable, and complete.
- Describe how the proposed approach will achieve each program metric with sufficient detail and supporting experimental measurements, modeling, calculations, and/or simulations.

2. Potential Contribution and Relevance to the DARPA Mission

- DARPA's mission is to make pivotal early technology investments that create or prevent strategic surprise for U.S. National Security

3. Cost Realism

- Ensure proposed costs are realistic for the technical and management approach and accurately reflect the goals and objectives of the solicitation.
- Verify that proposed costs are sufficiently detailed, complete, and consistent with the Statement of Work.
- Undue emphasis on cost may motivate low-risk ideas with minimum uncertainty and to staff the effort with junior personnel in order to be in a more competitive posture. DARPA discourages such cost strategies.



Important Dates (All Times ET)



- **BAA Posting Date:** September 21, 2023
- **Proposers Day:** September 22, 2023
- **Abstract Due Date:** October 27, 2022 at 4:00 PM
- **FAQ Submission Deadline:** November 29, 2023 at 4:00 PM
 - DARPA will post a consolidated Frequently Asked Questions (FAQ) document on a regular basis
 - To access the posting go to <https://www.darpa.mil/work-with-us/opportunities>
- **Proposal Due Date:** December 18, 2023 at 4:00 PM
- **Estimated Period of Performance Start:** June 1, 2024

Questions: HR001123S0052@darpa.mil



Proposers Day Agenda



Start (ET)	Duration	Topic/Speaker
8:30	0:30	CHECK-IN
9:00	0:15	Welcome, Security, Logistics <i>TBD</i>
9:15	0:10	Introduction to MTO and the ERI <i>Mark Rosker, DARPA/MTO Office Director</i>
9:25	0:30	Program Overview <i>Justin Cohen, DARPA/MTO Program Manager</i>
9:55	0:30	Contracting Overview <i>Caroline "Carrie" Allen, DARPA/CMO Contracting Officer</i>
10:25	0:05	Introduction to DARPAConnect <i>Sana Hoda Sood, Applied Research Institute</i>
10:30	0:10	BREAK
10:40	0:20	The Quantum Side of Gravitational-Wave Detectors: LIGO <i>Lisa Barsotti, MIT LIGO Laboratory</i>
11:00	0:15	Quantum-Enhanced Detection Applications <i>Scott Hamilton, MIT Lincoln Laboratory</i>
11:15	0:15	Squeezed Quantum Sensors and Networks <i>Ben Lawrie, Oak Ridge National Laboratory</i>
11:30	0:10	BREAK
11:40	0:45	Lightning Round 1 <i>Attendees</i>
12:25	1:05	LUNCH (not provided)
13:30	0:45	Lightning Round 2 <i>Attendees</i>
14:15	0:30	Q&A Session <i>Justin Cohen, DARPA/MTO Program Manager</i>
14:45	2:15	Sidebar Discussions (by appointment) <i>Justin Cohen, DARPA/MTO Program Manager</i>
17:00	-	ADJOURN



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Intensity-Squeezed Photonic Integration for Revolutionary Detectors (INSPIRED)

Justin Cohen
Program Manager, DARPA MTO



Proposers Day
September 22, 2023



**Presentation as originally given at
Proposers Day.**



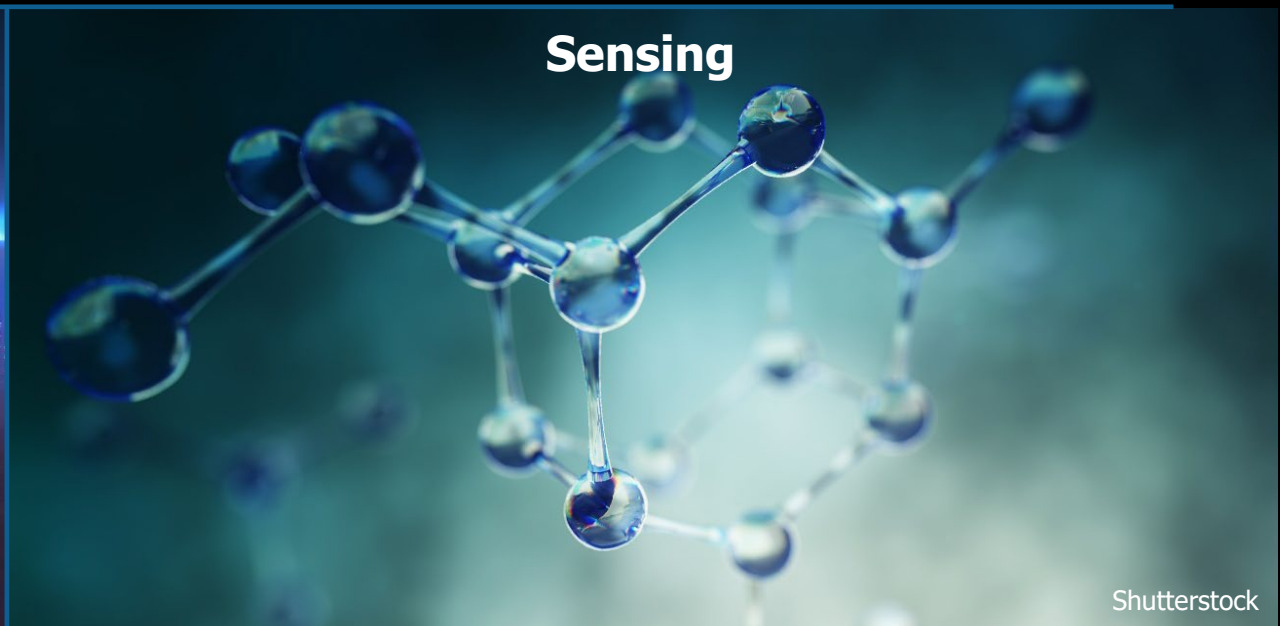
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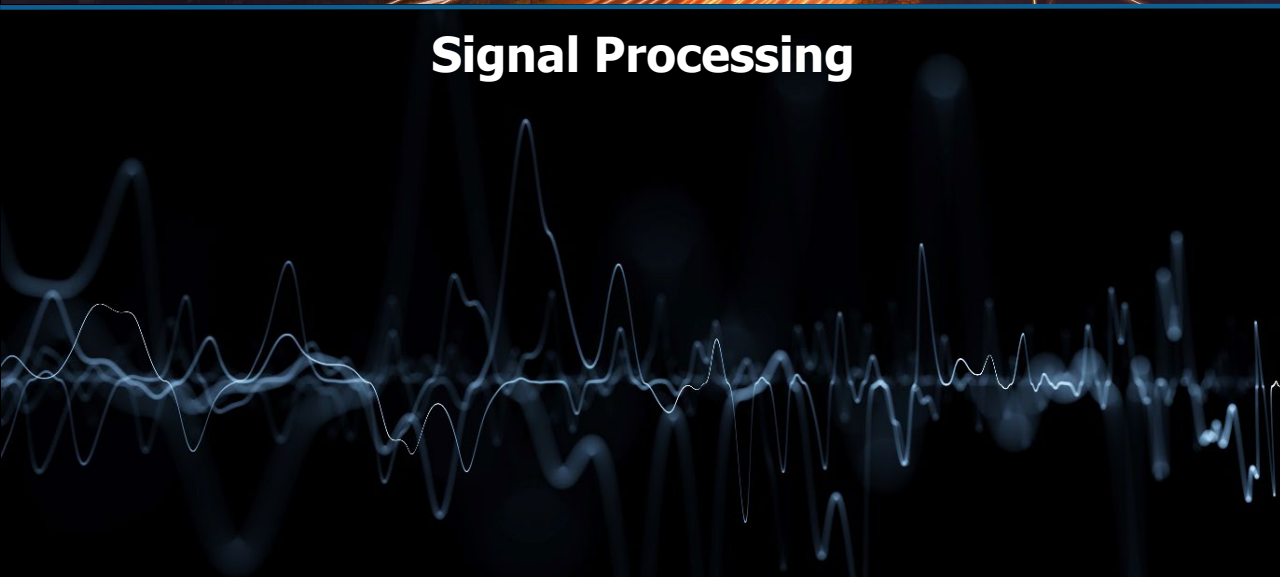
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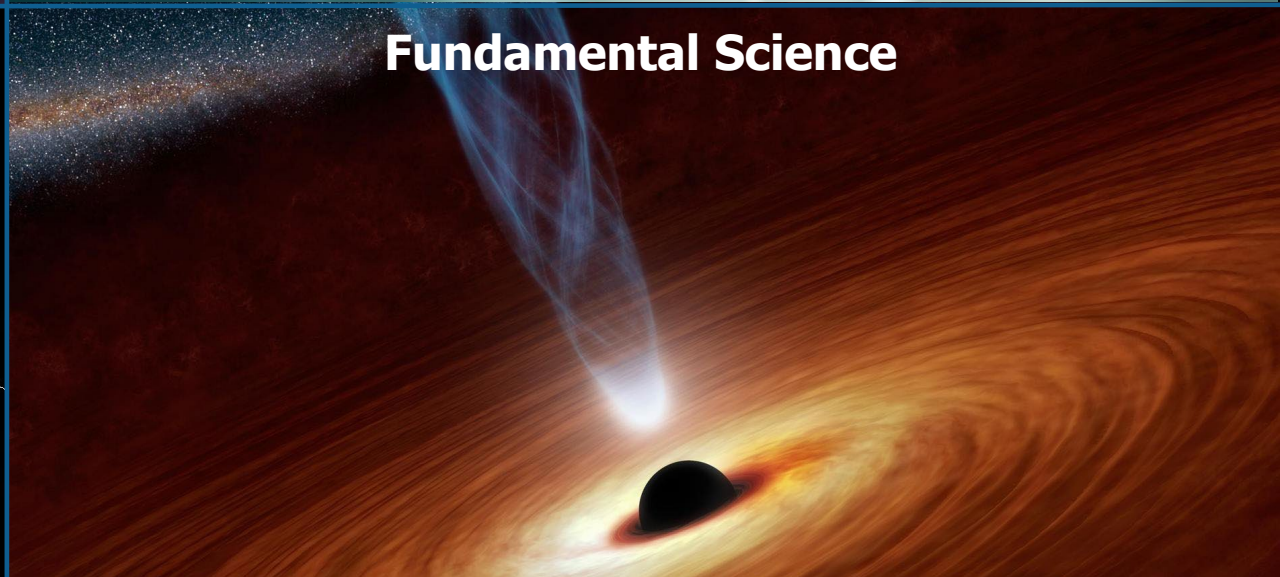
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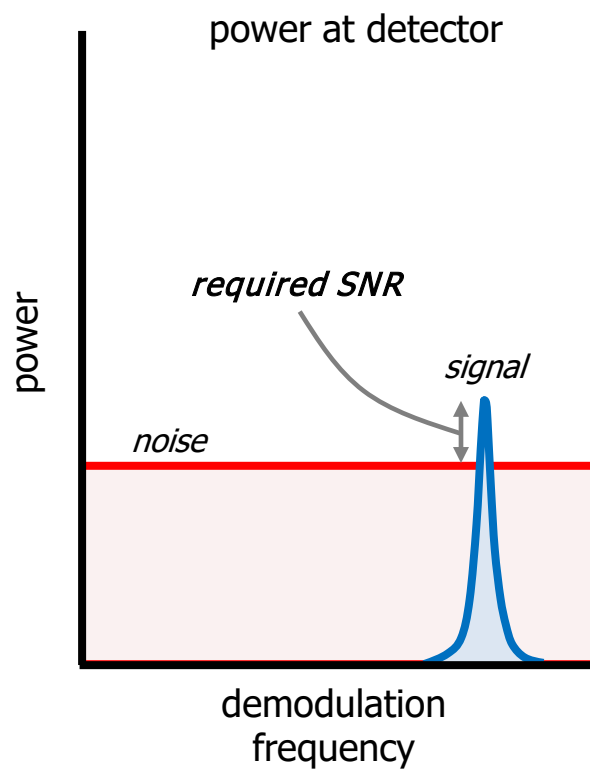
Signal Processing



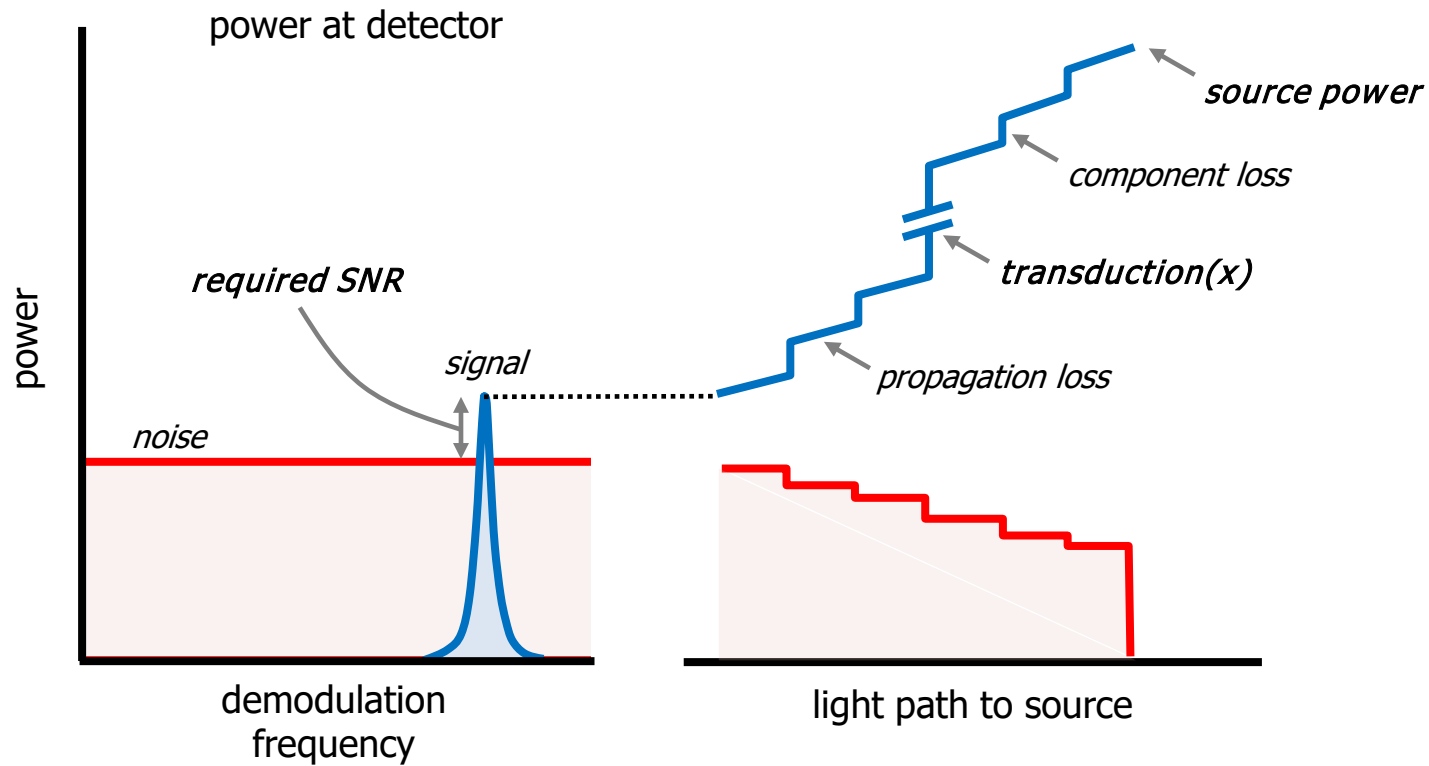
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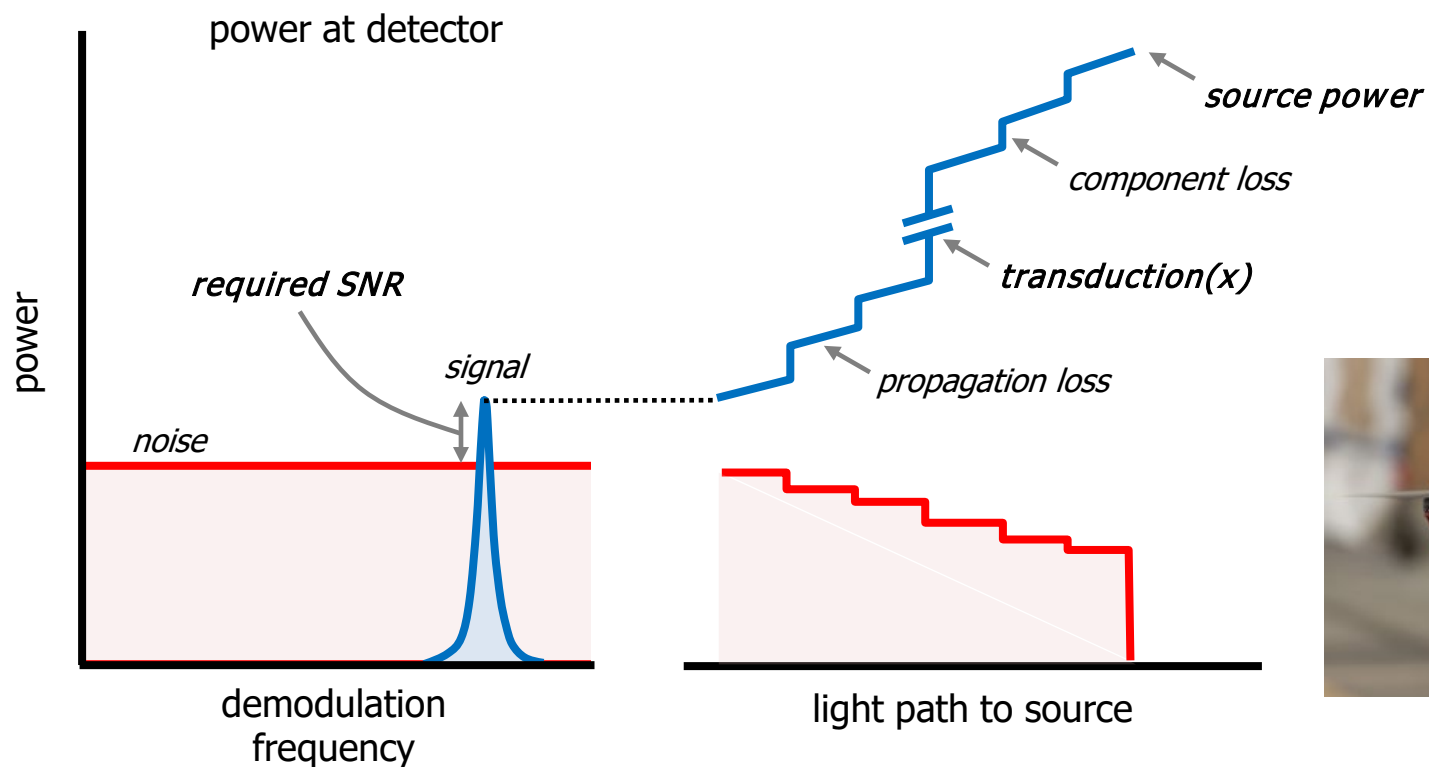
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DARPA

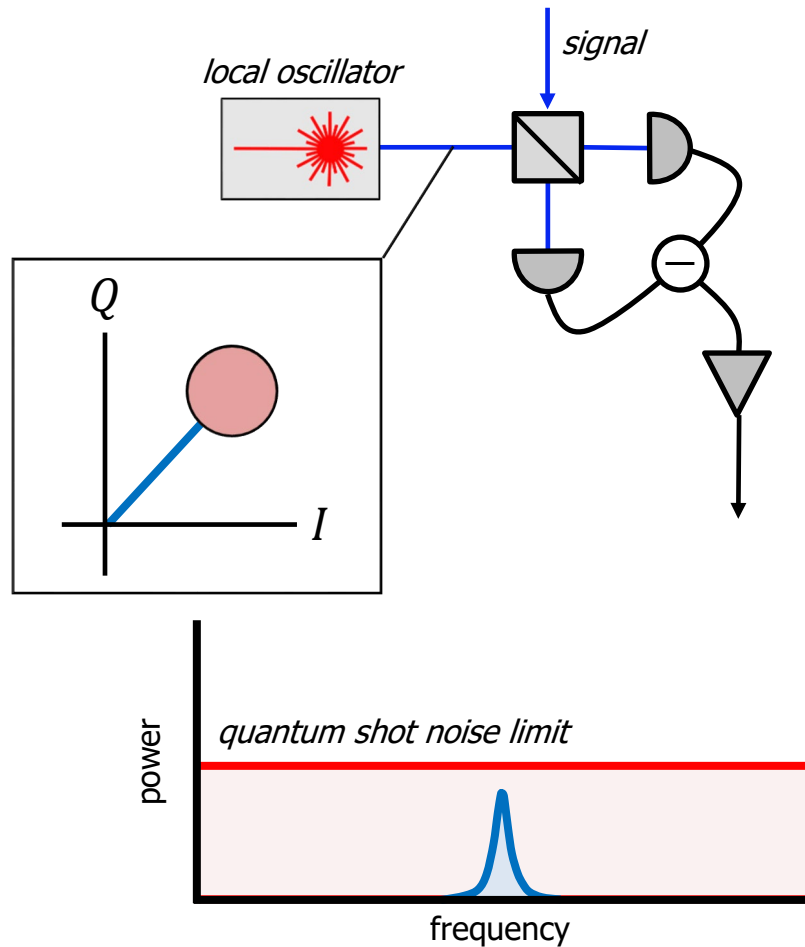


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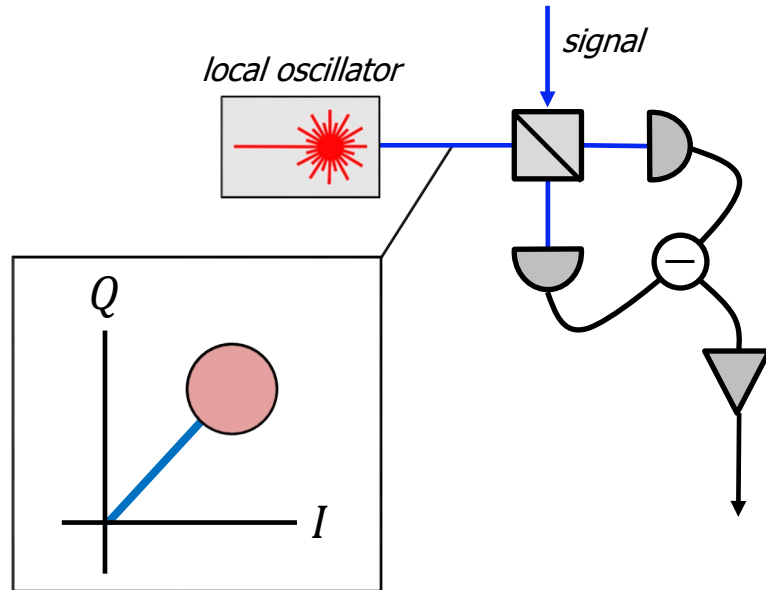
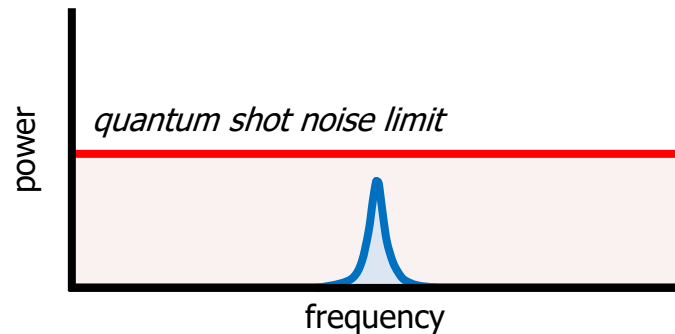


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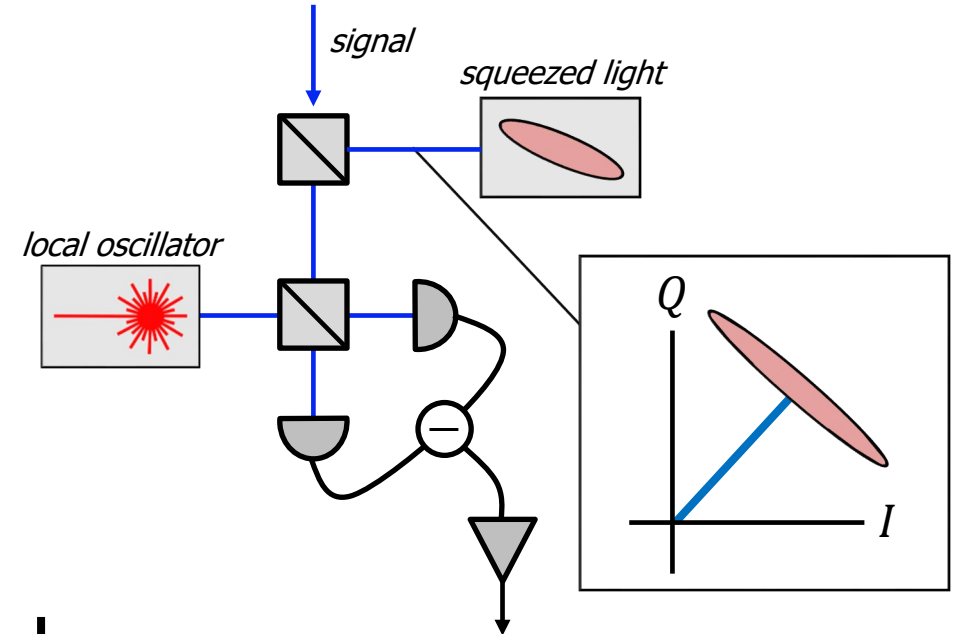
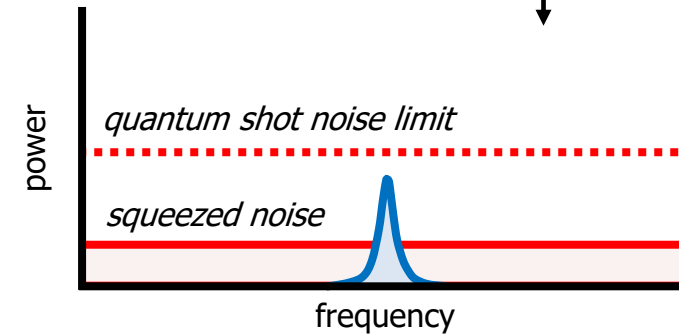
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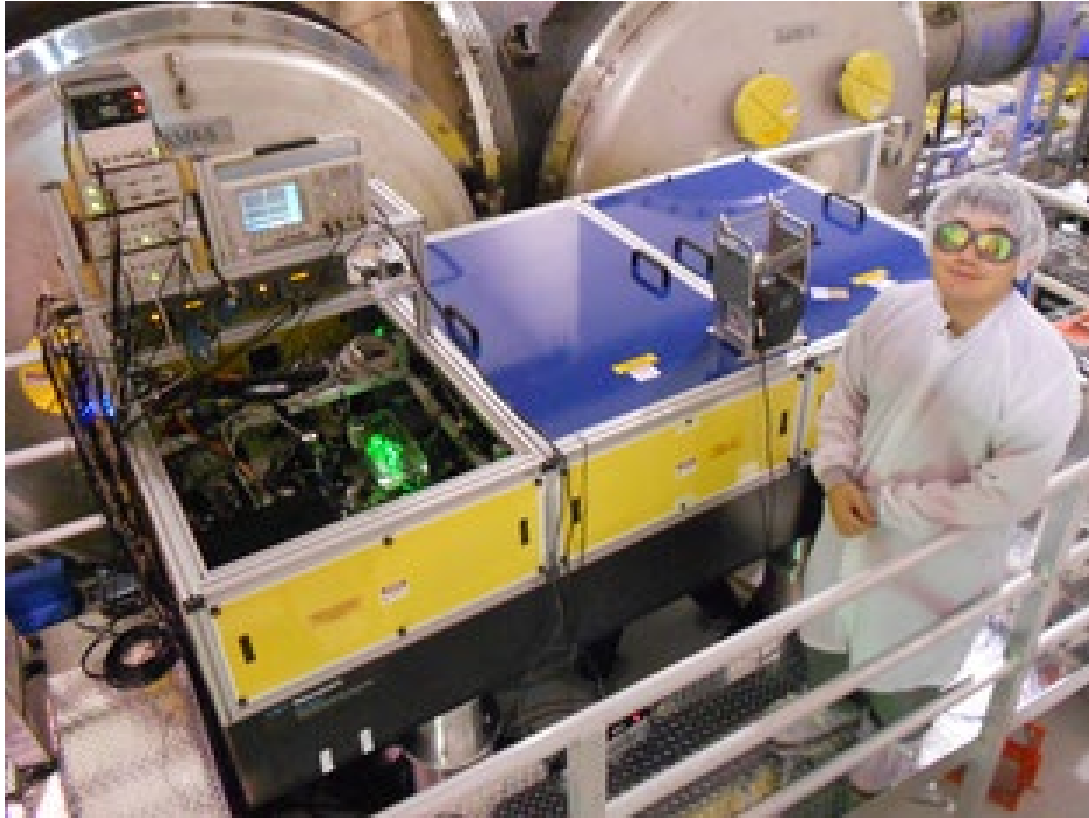


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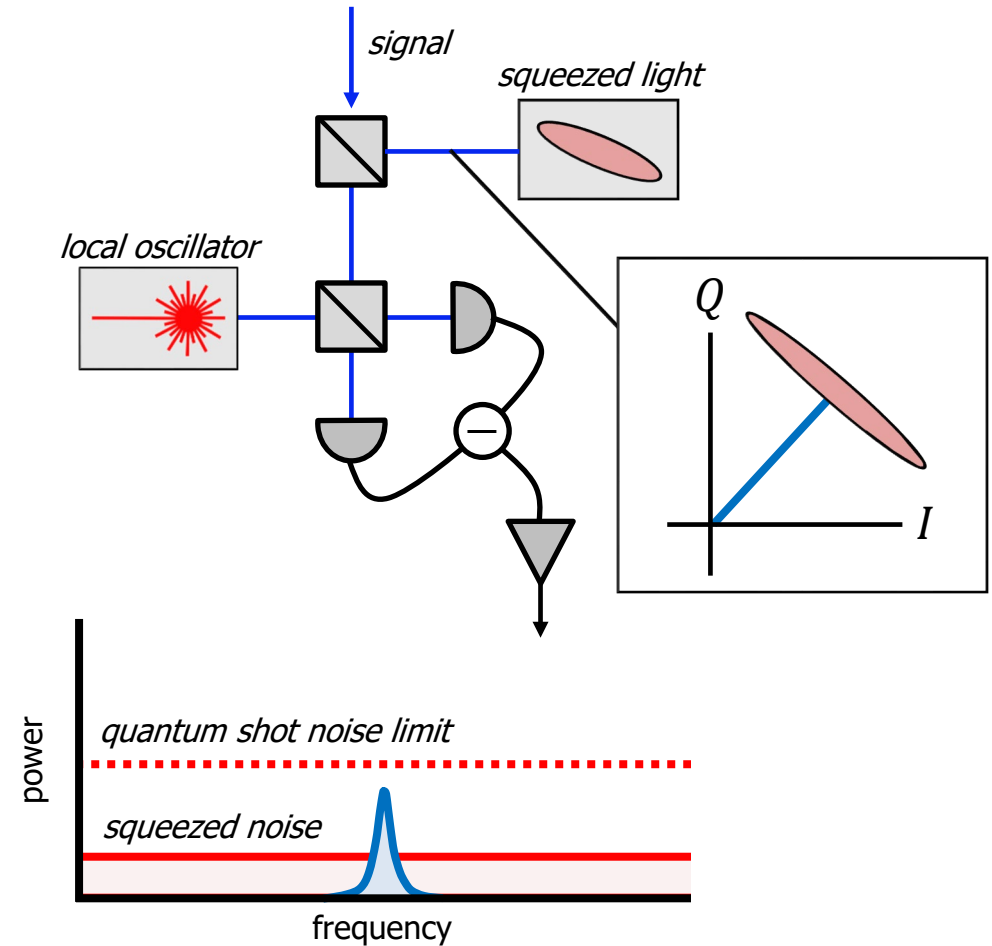
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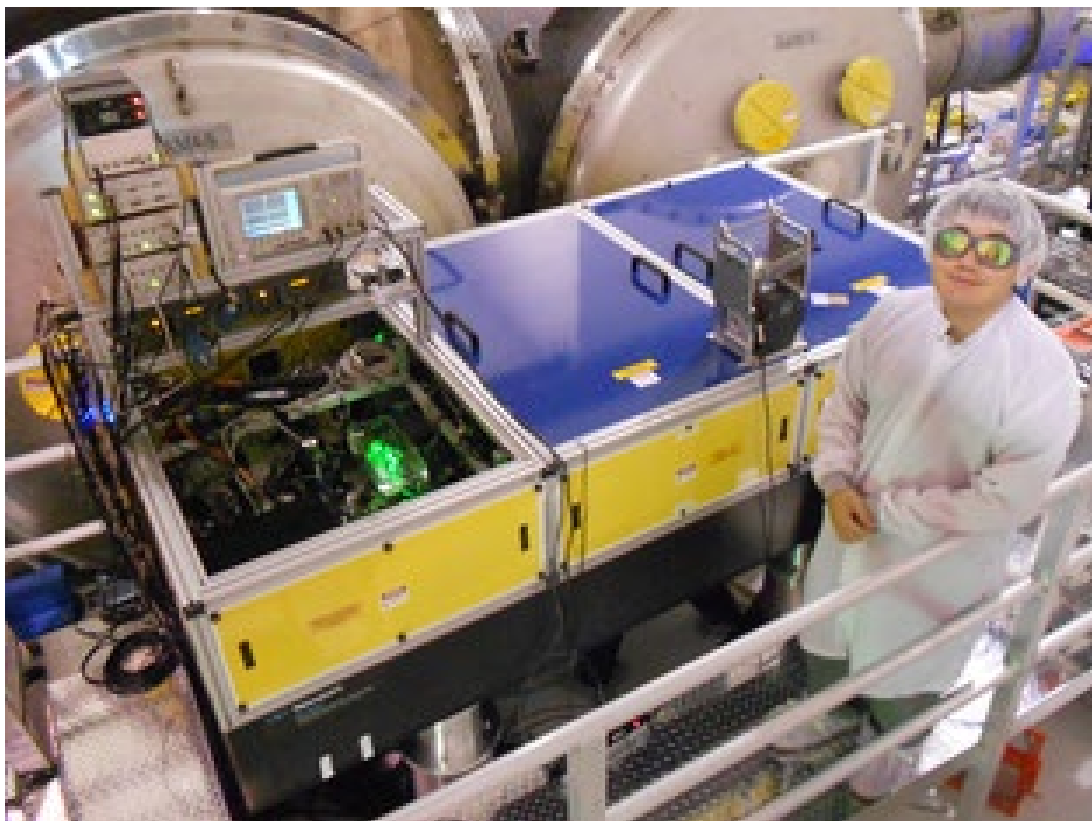




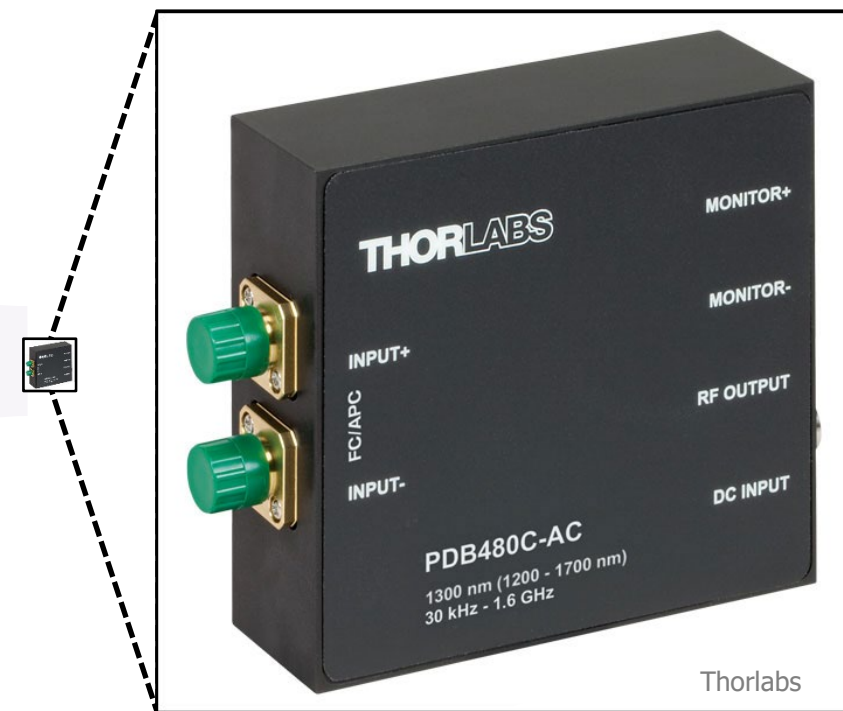
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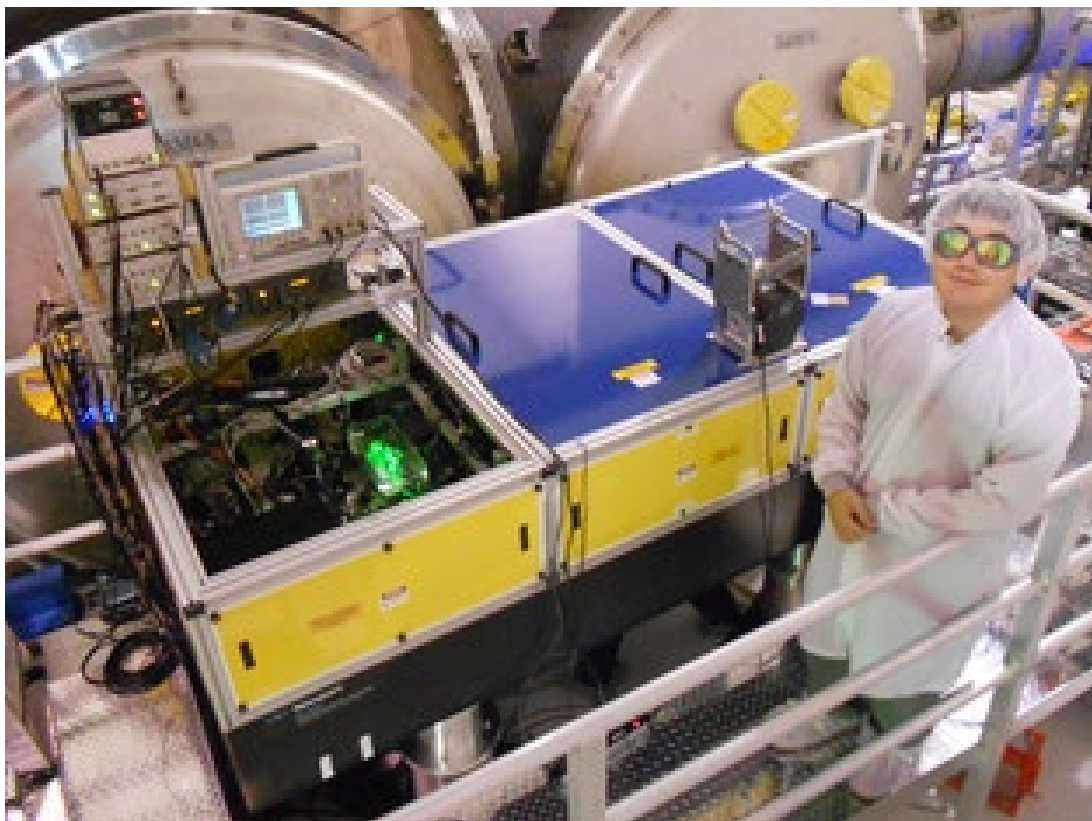




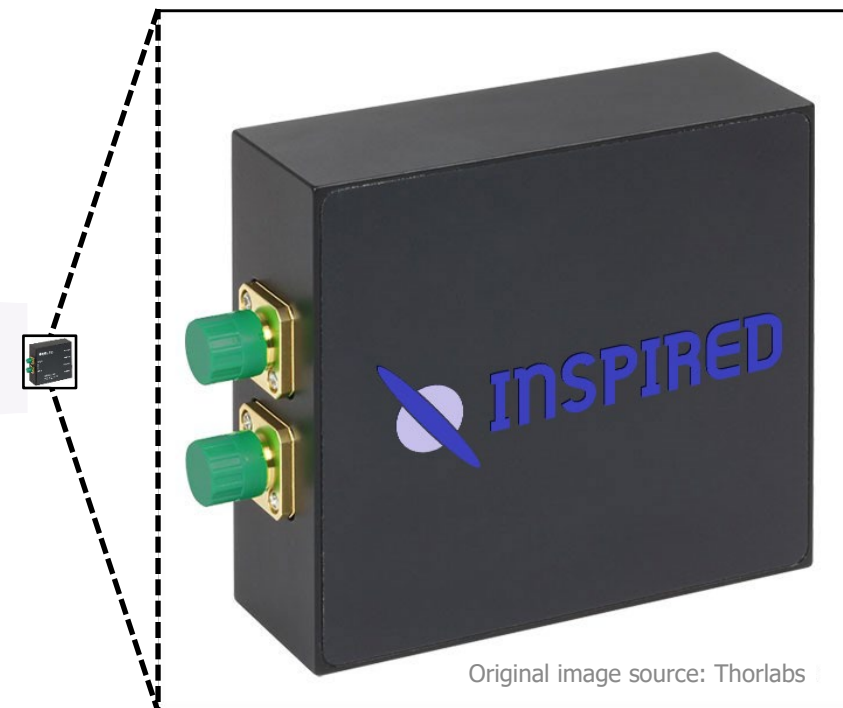
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Thorlabs

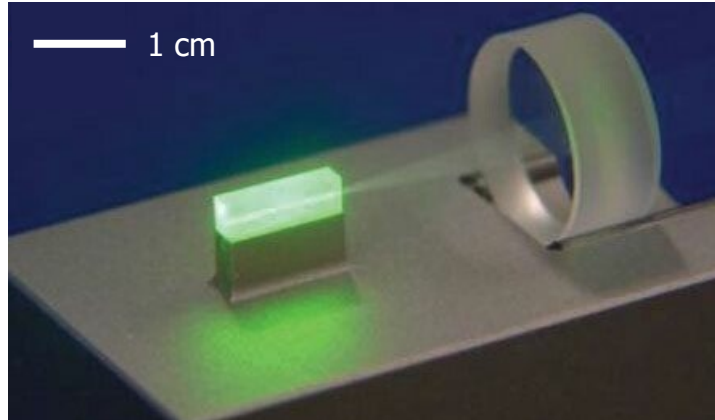


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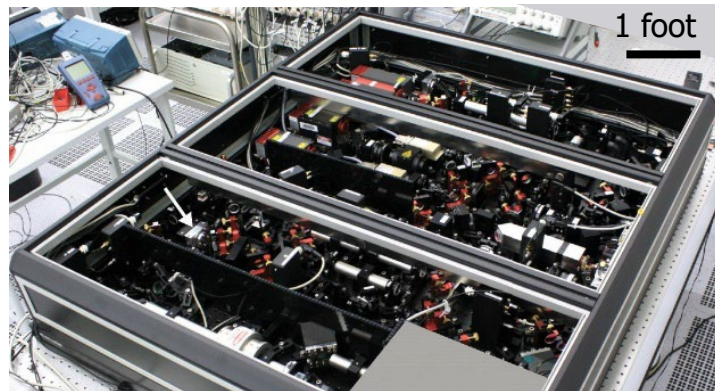


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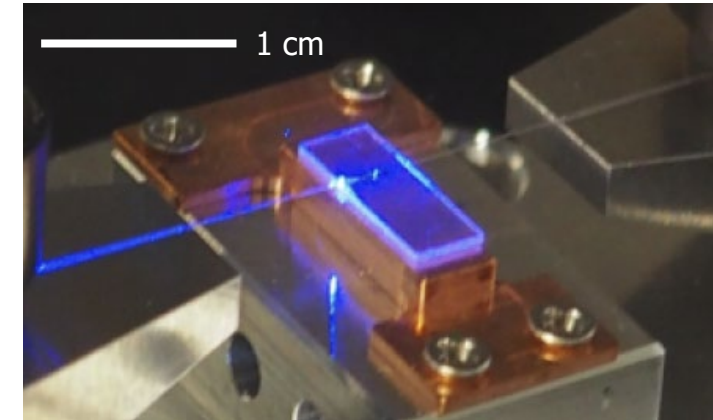


Schnabel, *Phys. Today*, 2022: GEO 600

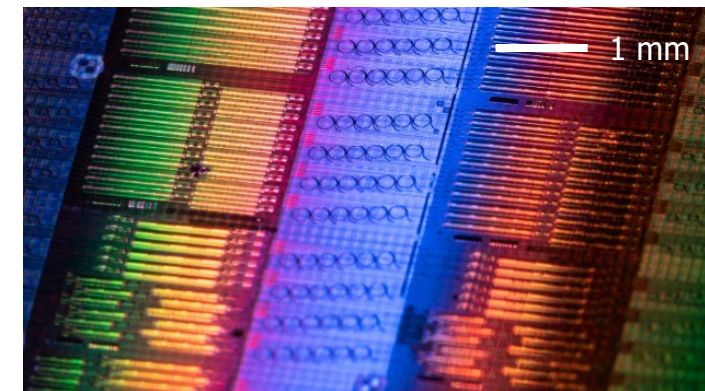


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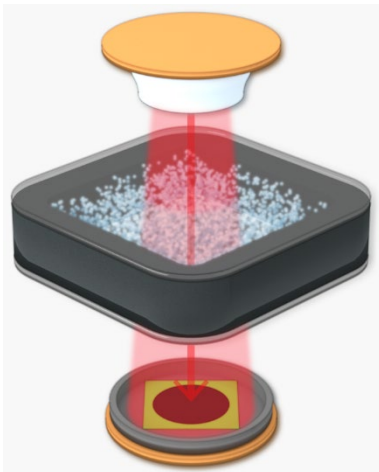
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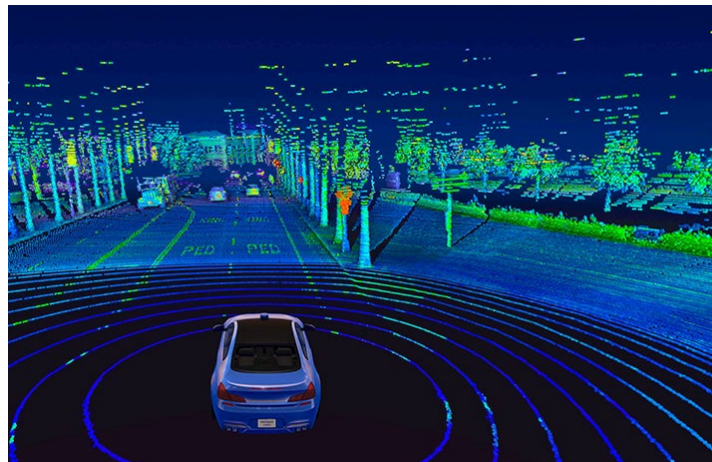
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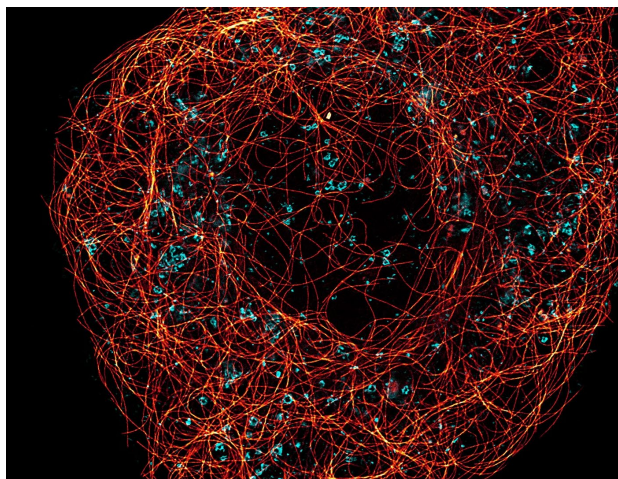
Velodyne

Inertial Sensing



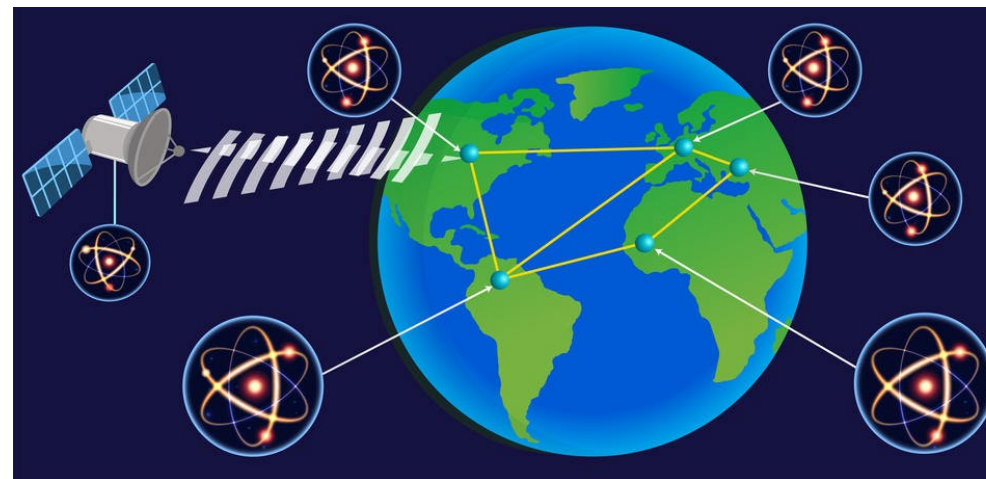
Honeywell

Biological Sensing



Leica

Quantum Computing and Networking



NIST

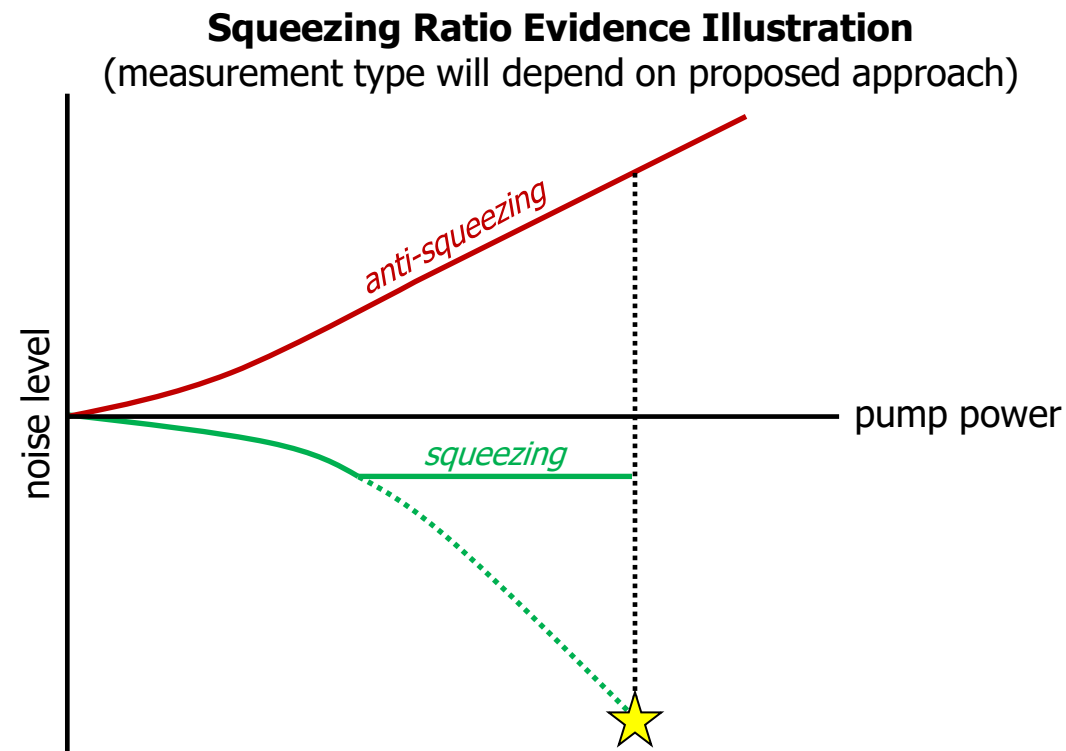


INSPIRED Test Article	Metric	Unit	Phase 1	Phase 2
Squeezed-Light Generator	Squeezing Ratio	dB	16	-
Interferometer Circuit	Aggregate Optical Loss	dB	0.1	-
Integrated Squeezed-Light Detector	Sensitivity	zW/Hz	-	10
	Volume	cm ³	-	100

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May be met by:

- Direct squeezed quadrature measurement, and
- Extrapolation of anti-squeezed quadrature measurement,
- Consistent with noise model.



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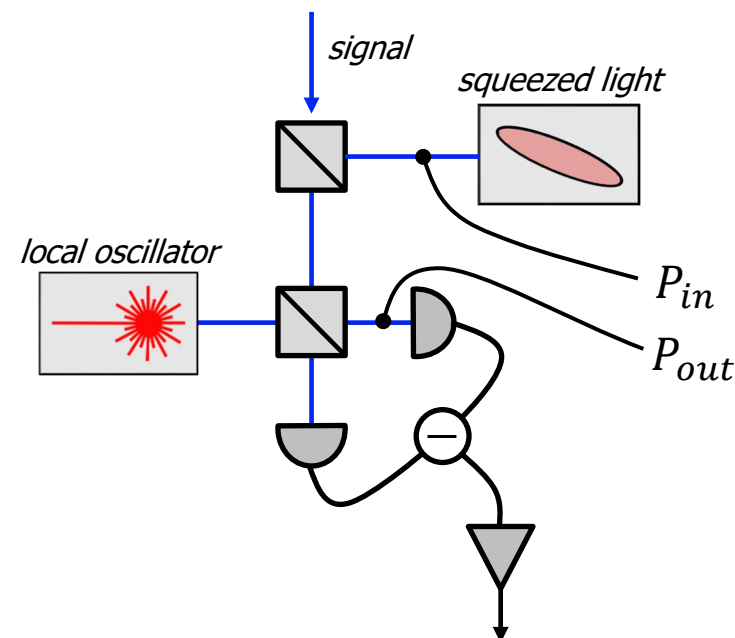
Simplified Detector Schematic

(components in loss chain will depend on proposed approach)

Loss: Including all losses encountered by squeezed light in the Interferometer Circuit

- Can exclude photodetector quantum efficiency in Phase 1

Phase sensitivity: Interferometer must lock to any quadrature across 2π radians to a precision of 10 mrad



INSPIRED Test Article	Metric	Unit	Phase 1	Phase 2
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	Volume	cm ³	-	100

Assumes vacuum-squeezed homodyne detection

- Sensitivity calculated as version of Noise Equivalent Power for homodyne:
 - One-sided noise power spectral density divided by the local oscillator power
- Commensurate with 16 dB of noise reduction from the shot-noise limit:
 - $(2hc)/\lambda \times 10^{-1.6} \approx 10$ zW per Hz of bandwidth

Alternative approaches are allowed

- Sensitivity should be calculated as minimum detectable signal power
 - In this case, metric shall be 16 dB lower than integrated shot noise
- Must be measured directly during the program

Operating wavelength within 5% of 1064 nm, 1300 nm, or 1550 nm

- Scale the 10 zW/Hz sensitivity metric by factor of $1064/\lambda$

Bandwidth from DC – 10 GHz at 3 dB of sensitivity



Original image source: Thorlabs

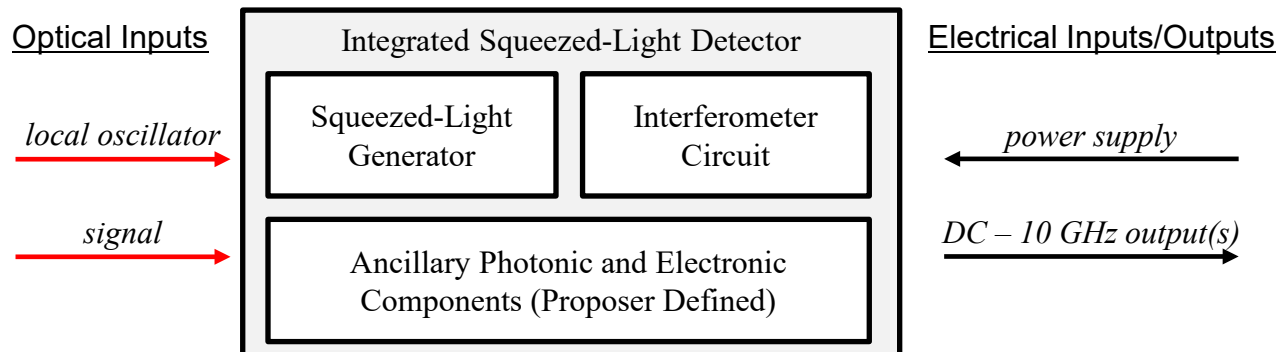
INSPIRED Test Article	Metric	Unit	Phase 1	Phase 2
Squeezed-Light Generator	Squeezing Ratio	dB	16	-
Interferometer Circuit	Aggregate Optical Loss	dB	0.1	-
Integrated Squeezed-Light Detector	Sensitivity	zW/Hz	-	10
	Volume	cm ³	-	100

In the box:

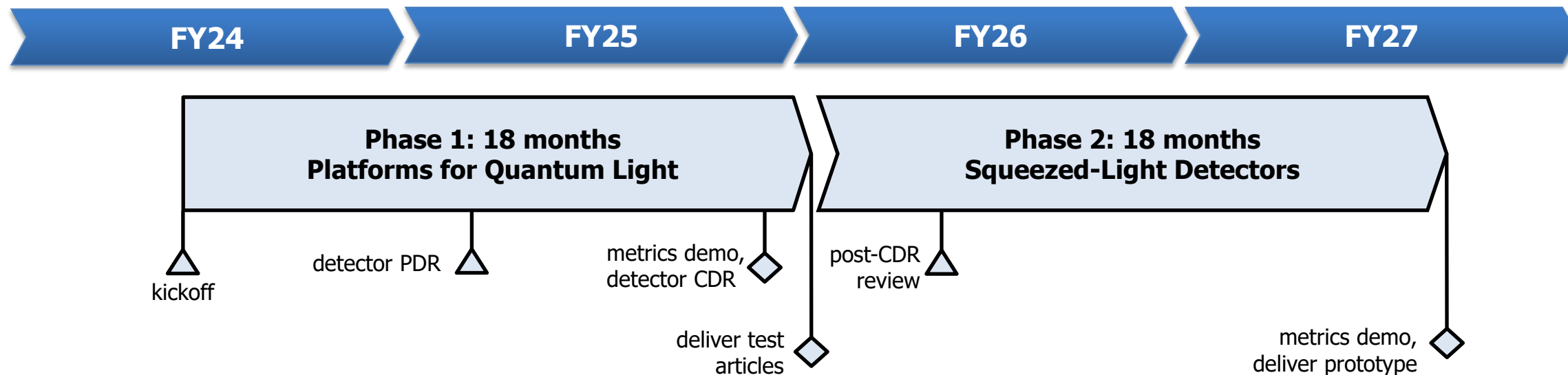
- All optoelectronic components needed to perform measurement at sensitivity metric

Inputs and outputs:

- Optical: common fiber or a free space modes of standard lab equipment
- Electrical: standard connectors, can include multiple output ports to span spectrum



Original image source: Thorlabs



• Financial Details

- Base (Phase 1) + Option (Phase 2)
- 6.2 Funding
- Multiple awards

• Major Goals and Outcomes

- Phase 1 – Develop the central chip-scale photonic devices required for a squeezed-light detector
- Phase 2 – Deliver compact squeezed-light detector prototype with sensitivity exceeding the quantum limit



- Realizing **chip-scale photonic devices** and **circuits** that can efficiently **prepare, manipulate, and detect quantum states of light**
- Achieving **low aggregate loss** in complex, **multi-component circuits**
- Generating a **high squeezing ratio** in **size- and power-constrained devices**
- Maintaining **stable optical phase**
- Mitigating **classical noise**

Meeting the challenges...

- Likely entails broad innovation in **materials, design, and fabrication**
- **Any approach** that demonstrates a **credible path** to satisfying all metrics and goals stated herein **will be considered for selection**



- Response to all program **metrics**, **milestones**, and **deliverables** stated in the BAA
- The **method of squeezed-light generation and signal detection** based on chip-scale photonic components
- **Constructive plan** to demonstrate the test articles
- **List of the expected ancillary components**, both photonic and electronic
- Technical approach **elements that support meeting metrics**
- **Evidence** that these elements can be achieved
 - **Calculations** based on empirical parameters, **simulations**, or initial related **experiments**
- Other **technical noise sources**, **loss sources**, and **stray light sources** specific to the proposed approach, and plans to mitigate. For example:
 - **Resonator losses** inherent in extracting squeezed light from a cavity
 - **Technical laser noise**
 - **Amplifier noise** in balanced photodetectors



1. Overall Scientific and Technical Merit

- The proposed technical approach is innovative, feasible, achievable, and complete.
- Describe how the proposed approach will achieve each program metric with sufficient detail and supporting experimental measurements, modeling, calculations, and/or simulations.

2. Potential Contribution and Relevance to the DARPA Mission

- DARPA's mission is to make pivotal early technology investments that create or prevent strategic surprise for U.S. National Security

3. Cost Realism

- Ensure proposed costs are realistic for the technical and management approach and accurately reflect the goals and objectives of the solicitation.
- Verify that proposed costs are sufficiently detailed, complete, and consistent with the Statement of Work.
- Undue emphasis on cost may motivate low-risk ideas with minimum uncertainty and to staff the effort with junior personnel in order to be in a more competitive posture. DARPA discourages such cost strategies.



Important Dates (All Times ET)



- **BAA Posting Date:** September 21, 2023
- **Proposers Day:** September 22, 2023
- **Abstract Due Date:** October 20, 2022 at 4:00 PM
- **FAQ Submission Deadline:** November 29, 2023 at 4:00 PM
 - DARPA will post a consolidated Frequently Asked Questions (FAQ) document on a regular basis
 - To access the posting go to <https://www.darpa.mil/work-with-us/opportunities>
- **Proposal Due Date:** December 13, 2023 at 4:00 PM
- **Estimated Period of Performance Start:** June 1, 2024

Questions: HR001123S0052@darpa.mil



Proposers Day Agenda



Start (ET)	Duration	Topic/Speaker
8:30	0:30	CHECK-IN
9:00	0:15	Welcome, Security, Logistics <i>TBD</i>
9:15	0:10	Introduction to MTO and the ERI <i>Mark Rosker, DARPA/MTO Office Director</i>
9:25	0:30	Program Overview <i>Justin Cohen, DARPA/MTO Program Manager</i>
9:55	0:30	Contracting Overview <i>Caroline "Carrie" Allen, DARPA/CMO Contracting Officer</i>
10:25	0:05	Introduction to DARPAConnect <i>Sana Hoda Sood, Applied Research Institute</i>
10:30	0:10	BREAK
10:40	0:20	The Quantum Side of Gravitational-Wave Detectors: LIGO <i>Lisa Barsotti, MIT LIGO Laboratory</i>
11:00	0:15	Quantum-Enhanced Detection Applications <i>Scott Hamilton, MIT Lincoln Laboratory</i>
11:15	0:15	Squeezed Quantum Sensors and Networks <i>Ben Lawrie, Oak Ridge National Laboratory</i>
11:30	0:10	BREAK
11:40	0:45	Lightning Round 1 <i>Attendees</i>
12:25	1:05	LUNCH (not provided)
13:30	0:45	Lightning Round 2 <i>Attendees</i>
14:15	0:30	Q&A Session <i>Justin Cohen, DARPA/MTO Program Manager</i>
14:45	2:15	Sidebar Discussions (by appointment) <i>Justin Cohen, DARPA/MTO Program Manager</i>
17:00	-	ADJOURN



www.darpa.mil



Intensity-Squeezed Photonic Integration for Revolutionary Detectors (INSPIRED) HR001123S0052

**Proposers Day
September 22, 2023**

Amended as of October 2, 2023

**Caroline Allen
Contracting Officer
DARPA Contracts Management Office**





Proposers Day Disclaimer

- **A copious amount of information is made available to potential proposers to clarify program goals/objectives and proposal preparation instructions.**

However:

- Only the information/instructions in the BAA count
- Proposals will only be evaluated in accordance with the instructions provided in the BAA
- Answers for FAQs that differ from the BAA will be made formal by an amendment to the BAA

Only a duly authorized Contracting Officer may obligate the Government



BAA Overview

- **Described in Federal Acquisition Regulation Part 35:**
 - For the acquisition of basic and applied research
 - BAAs allow for a variety of technical solutions
 - FAR 35.016 (a): Shall only be used when “meaningful proposals with varying technical/scientific approaches can be reasonably anticipated.”
 - The BAA defines the problem set, the proposer defines the solution (and SOW)
- **DARPA Scientific Review Process**
 - Proposals are evaluated on individual merit and relevance as it relates to the stated research goals/objectives rather than against one another
 - Selections will be made to proposers whose proposals are determined to be most advantageous to the Government, all factors considered, including potential contributions to research program and availability of funding
 - **Government may select for negotiation all, some, one, or none of the proposals received**
 - **Government may accept proposals in their entirety or select only portions thereof**
 - **Government may elect to establish portions of proposal as options**



BAA Overview, Cont'd

- **Multiple Awards Anticipated**
- **Multiple award instrument types:**
 - Procurement contract
 - Cooperative Agreement
 - Other Transaction
- **Phase 1 (Base Period)**
 - will develop the central chip-scale photonic devices required for a squeezed-light detector. The two test articles for Phase 1 are a squeezed-light generator with high SR and a phase-sensitive interferometer circuit with low aggregate optical loss.
 - 18 months
- **Phase 2 (Option Period)**
 - will demonstrate squeezed-light detector prototypes with sensitivity exceeding the quantum shot noise limit in a module with volume comparable to commercial photodetector components. .
 - 18 months



BAA Process/Timeline

1. **BAA published: September 21, 2023**
2. **Proposers Day: September 22, 2023**
3. **Abstracts Due: October 27, 2023**
4. **FAQ Submission Deadline: November 29, 2023**
5. **Proposals Due: December 18, 2023**
7. **Proposals are checked for BAA compliance**
Non-conforming proposals are not reviewed (and cannot be selected)
8. **Government conducts Scientific Review Process**
Clarification requests may be sent to various proposers
8. **Government sends out notification letters: ~ March 2024**
9. **Contracts negotiated & awarded (performance start): ~ June 2024**
(can assume 1 June 2024 for Pricing)

See BAA for complete date/time information
Monitor SAM.gov for any BAA amendment(s)



Eligibility Issues

- All interested/qualified sources may respond subject to the parameters outlined in BAA
- Foreign participants/resources may participate to the extent allowed by applicable Security Regulations, Export Control Laws, Non-Disclosure Agreements, etc.
- FFRDCs and Government entities:
 - Are not prohibited by the BAA from proposing
 - Are, however, subject to applicable direct competition limitations
 - Are, however, required to demonstrate eligibility (sponsor letter)
 - **The burden to prove eligibility for all such team members rests with the proposer**
 - **All elements of a proposal (tech and cost, prime and subs – even FFRDC team members) must be included in the prime's submission**
- Conflicts of Interest:
 - Real and/or Perceived
 - Identify any conflict/s
 - If any are identified, a mitigation plan must be included



Abstracts (1 of 2)

- **Abstracts are strongly encouraged:**
 1. They minimize unnecessary effort in proposal preparation and review
 2. They reduce the potential expense of preparing an out of scope proposal

- **Government will reply by letter with one of two possible responses:**
 1. Encourage full proposal, and may provide feedback
 2. Discourage full proposal, and will provide feedback

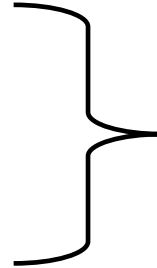
- **Regardless of DARPA's response to an abstract, proposers may submit a full proposal**
 - DARPA will review all full proposals submitted without regard to abstract recommendation/feedback



Abstracts (2 of 2)

- **Abstracts must include the following components:**

- Cover Sheet
- Technical Approach and Innovation
- Program Plan
- Proposer Capabilities



Max of 6 pages

The total page limit does not include the cover sheet (required) or a submission letter (optional)

- **Submit UNCLASS submissions to the DARPA BAA Website (<https://baa.darpa.mil>) per the instructions in Section IV.C.2, “Abstract Submission Information,” of the BAA.**



Full Proposal Ground Rules

- **KEY POINTS:**

- **One Technical Area: TA1**
- **Both Phases must be proposed (Base and priced Option)**
- **An organization/company/individual can be on multiple proposals**
- **Submit unclassified proposals ONLY to the DARPA BAA Website (<https://baa.darpa.mil>)**
 - **Click “Finalize Full Proposal” button** (otherwise you have not submitted)
 - Do not submit classified proposals/information to the DARPA BAA Website
 - If unsure, please follow the instructions in the BAA for inquiring



- **Submit drafts early...check your systems!**
- **Follow the instructions**
- **Address each of the technical challenges and limitations defined in the solicitation**
- **Clearly articulate the innovation of your approach (as applied to the technical challenge and limitations)**
- **Provide evidence of assertions within the proposal**
- **Develop a compliance matrix to ensure completeness**
- **Use cost realism**



Full Proposal Preparation

- **Volume 1: Technical/Management Proposal**

- Be mindful of the page limitations (**25 pages**)
- Be sure to respond to all **11** of the required “Detailed Proposal Information” items
 - Technical Approach – is the centerpiece of the technical proposal
 - Statement of Work – **Organize by Phase/Option, then by Tasks**. Define all tasks (what you are doing, not how you are doing it) and deliverables (data, software, and material items, as applicable).
- **Pay attention to key technical elements in the “Funding Opportunity Description” that must be addressed in all proposals**

- **Volume 2: Cost Proposal**

- No page limitations
- **DARPA Standard Cost Proposal Spreadsheet (required for all instrument types)**
- Fully detailed cost build-ups/estimates (**Prime & Subcontractors**)(**All instrument types**)
 - Summary Cost Build-up: By phase and performer fiscal year
 - Detailed Cost Build-up: By phase, technical task, and month
- **Subcontractor proposals are required (to include SOW)**
- **No Rough Order of Magnitudes (ROMs)**
- **Certificate of Current Cost/Pricing Data will be required for any procurement contract award meeting the prescribed threshold (i.e., the adequate price competition exemption does not apply to BAAs)**



Full Proposal Preparation, cont'd

Volume 2: Cost Proposal

– DARPA Standard Cost Proposal Spreadsheet

The Government **requires** that proposers use the provided MS Excel™ DARPA Standard Cost Proposal Spreadsheet in the development of their cost proposals. A customized cost proposal spreadsheet may be an attachment to this solicitation. If not, the spreadsheet can be found on the DARPA website at <http://www.darpa.mil/work-with-us/contract-management> (under “Resources” on the right-hand side of the webpage). All tabs and tables in the cost proposal spreadsheet should be developed in an editable format with calculation formulas intact to allow traceability of the cost proposal. **This cost proposal spreadsheet should be used by the prime organization and all subcontractors. In addition to using the cost proposal spreadsheet, the cost proposal still must include all other items required in this announcement that are not covered by the editable spreadsheet.** Subcontractor cost proposal spreadsheets may be submitted directly to the Government by the proposed subcontractor via e-mail to the address in Part I of this solicitation. Using the provided cost proposal spreadsheet will assist the Government in a rapid analysis of your proposed costs and, if your proposal is selected for a potential award, speed up the negotiation and award execution process.

- **Use the single TA spreadsheet**
- **Do not make changes that are specifically prohibited by the instructions**
- **Questions are welcomed. Please direct them to costproposal@darpa.mil**



Data Rights

- **Government desires as few restrictions as possible**

- **If asserting less than Unlimited Rights (e.g., Restrictions):**
 - Provide and justify basis of assertions using the prescribed format
 - Explain how each item will be used to support the proposed research project
 - Explain how the Government will be able to reach its program goals (including technology transition)

- ✓ The proposer (prime) must submit a Data Rights Cert covering the entire team (prime and subcontractors), as applicable

- ✓ Provide a Data Rights Cert no matter the instrument type being proposed

- ✓ **This information is assessed during evaluations (barriers to transition)**



Non-Conforming Proposal Determinations

- **Failure to submit proposal on time – non-conforming!**
 - Proposal due date and BAA closing date are the same – so, **late is late!**
- **Failure to submit using the correct mechanism – non-conforming!**
 - Unclassified proposals ONLY to DARPA BAA website
 - Classified proposals/information ONLY per “Security Information” section of the BAA
- **Failure to submit both proposal volumes – non-conforming!**
 - OT proposals must also include a full cost volume (**Cost Realism is an evaluation criterion for all proposals**)
 - OT proposals must also include a detailed list of payment milestones (Milestone Plan)
- **Pages beyond the page limitation (tech prop) – additional pages will not be reviewed**
- **ROM/s instead of full subcontract cost proposal/s – non-conforming!**
 - “I didn’t have time to get the subcontract proposal(s)” will not change the outcome
 - “My subcontractor/s would not give me a proposal” will not change the outcome
- **Missing FFRDC or Government Entity cost proposal – non-conforming!**



Communications

- **Prior to Receipt of Proposals (Solicitation Phase): Follow instructions in BAA**
 - Typically handled through the FAQ, but see BAA exceptions (e.g., security)
- **After Receipt of Proposals/Prior to Selections (Scientific Review Phase): Limited to Contracting Officer or BAA Coordinator (with approval) to address clarifications requested by the review team**
 - Proposal cannot be changed in response to clarification requests
- **After Selection/Prior to Award (Negotiation Phase): Negotiations are conducted by the Contracting Officer**
 - PM and/or COR typically tasked with finalizing the SOW (with PI)
 - PM and/or COR typically involved in any technical discussions (i.e., partial selection discussions)
 - Pre-award costs will not be reimbursed unless a pre-award cost agreement is negotiated prior to award
- **Informal Feedback Sessions (Post Selection): May be requested/provided once the selection(s) are made**
 - If made on a timely basis (~2 wks after letter), all requests will be accepted



Referenced Links

- <http://www.darpa.mil/work-with-us/contract-management#SolicitationContracting>
(General DARPA contract management information)
(DARPA Standard Cost Proposal Spreadsheet)
- <http://www.darpa.mil/work-with-us/additional-baa>
(general BAA info pertaining to all instrument types)
- <http://www.darpa.mil/work-with-us/procurementcontracts>
(info pertaining to contracts)
- <https://acquisitioninnovation.darpa.mil/>
(info pertaining to OTs)
- <http://www.darpa.mil/work-with-us/rep-certs>
(DARPA-specific reps and certs for all instrument types)



DARPA CONNECT

DISCOVER · COLLABORATE · CONTRIBUTE

INSPIRED Proposers Day
September 22, 2023



Here Today, with DARPAConnect



Sana Hoda Sood
Communications, ARI
sana.hoda@thearius



Breaking Down Barriers to Entry for Nontraditional Performers

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DARPAConnect is designed to broaden DARPA's reach and stimulate growth and collaboration between DARPA, businesses, and academia.



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Your community space for learning,
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About DARPAConnect

Since 1958, the Defense Advanced Research Projects Agency (DARPA) has made pivotal investments in breakthrough technologies for national security. To both create and prevent strategic surprise within an ever-changing national security landscape, the agency seeks to engage the brightest minds and most robust ideas across different specialties, communities, and perspectives.

The agency launched DARPAConnect in late 2022 to broaden DARPA's reach with small businesses and educational institutions. DARPAConnect breaks down barriers of entry for performers new to DARPA and the national security space.

To that end, DARPA entered into a Partnership Intermediary Agreement (PIA) with the Applied Research Institute (ARI) to facilitate the DARPAConnect program. Together with the Tougaloo College Research and Development Foundation (TCRDF), ARI facilitates pop-up events, educational opportunities, workshops, mentorship programs, this online community, and more to support people throughout their DARPA journey.

DARPAConnect Offerings

There are multiple avenues which facilitate enhanced interaction between companies, academic institutions, and DARPA.



Learn more about DARPA employment, staff contacts, and opportunities you should know about.

Engagement



Explore a growing collection of learning modules to help you effectively work with DARPA.

Curriculum



Find other DARPAConnect participants for networking, mentorship, and teaming.

Directory



Access program archives including: events, webinars, reports, and more.

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1

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2

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Identify and engage PMs whose research interests align with your research

3

SPEAK THE HEILMEIER

Frame your ideas using DARPA's Heilmeier Catechism

PopUpEvent

November 3, 2023



**Hattiesburg,
Mississippi**

**Visit
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to view event details
and register!**



Thank You.

For more information or to request
assistance, please email us:

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