

**Frequently Asked Questions (FAQ)**  
**Quantum Testbeds Pathfinder**  
**May 3, 2018**

This document will be updated periodically as additional questions are received.

**Q1: I have a specific type of quantum computing hardware in my laboratory. Would this type of hardware be eligible for the Quantum Testbed Pathfinder program?**

A1: Proposals to the Quantum Testbed Pathfinder call should address one or both of the following themes:

1. Exploring the relationship between device architecture and application performance
2. Developing meaningful metrics for evaluating the suitability of quantum computing hardware for science applications

If the research you would like to do with your quantum computing hardware is consistent with these themes, it is eligible for the Quantum Testbed Pathfinder program. Your preproposal/pre-application should explain 1) which theme and 2) how the research addresses that theme.

**Q2: The term “high fidelity” is not precise. How do I know if my qubits have high enough fidelity gates to be considered in scope?**

A2: Proposals to the Quantum Testbed Pathfinder call should address one or both of the following themes:

1. Exploring the relationship between device architecture and application performance
2. Developing meaningful metrics for evaluating the suitability of quantum computing hardware for science applications

The call for proposals does not state a numerical value for “high fidelity” because the fidelity required to make meaningful progress on these two themes depends on the types of science applications the proposed research will consider. A preproposal or pre-application focused on a specific quantum computing device should clearly explain why the device’s demonstrated characteristics, including gate fidelity, are adequate for the proposed scope of work. Proposals for work contingent on planned improvements in qubit gate fidelity will be considered out of scope.

**Q3: Some of the out-of-scope criteria seem to be specific to the circuit model approach to quantum computing. Are schemes that do not rely on sequences of gate operations on qubits such as continuous-variable quantum computing and analog simulation allowed?**

A3: Yes.

**Q4: The call for proposals includes “development and optimization of quantum algorithms” in the out-of-scope criteria. What about adapting existing algorithms to current device architectures?**

A4: Proposals to the Quantum Testbed Pathfinder call should address one or both of the following themes:

1. Exploring the relationship between device architecture and application performance
2. Developing meaningful metrics for evaluating the suitability of quantum computing hardware for science applications

Research to understand how make the best use of various available quantum computing devices to run existing algorithms falls within the scope of theme 1, and could inform research on theme 2. Research to develop new algorithms and abstract optimization procedures for existing algorithms are out of scope.

**Q5: The call for proposals includes “schemes to improve performance and functionality of qubits” in the out-of-scope criteria. What about co-design research that may result in an improvement to qubits or qubit architecture?**

A5: Proposals to the Quantum Testbed Pathfinder call should address one or both of the following themes:

1. Exploring the relationship between device architecture and application performance
2. Developing meaningful metrics for evaluating the suitability of quantum computing hardware for science applications

Improvements to device architecture or individual components of quantum computing devices (qubits, interconnects, substrates, etc.) made in the context of research on either of these themes will be considered in scope. Proposals that focus on improving performance and/or functionality of qubits for their own sake will be considered out of scope.

**Q6: I would like to propose research related to what one of the existing Quantum Testbed Pathfinder teams is already doing. Should I submit a proposal to join their team or an independent proposal of my own?**

A6: The call for proposals gives prospective PIs the option of joining existing teams or submitting independent proposals. Proposals to join existing teams should expand the existing teams’ effort in a meaningful and integrated manner. Proposals to do self-contained work that is somehow related to or coordinated with the work of existing teams should be submitted as independent proposals.

**Q7: I have several ideas that are related in some way. Would it be better to group them together in one large proposal or submit several smaller proposals?**

A7: This program is likely to be highly competitive. You are encouraged, but not required, to submit a single proposal with your best ideas.

**Q8: I have been asked by several prospective PIs to have a small collaborative role in the project they plan to propose. Is it ok to participate in all of these or should I choose only one?**

A8: The funding opportunity places no restrictions on how many proposals an individual may participate in.

**Q9: What feedback will I receive on my preproposal/preapplication? Is it possible that part of the work discussed in my preproposal would be encouraged and another part would not?**

A9: You will receive notification of whether your preproposal/preapplication is encouraged or discouraged on or before April 18, 2018. Decisions to encourage or discourage preproposals/preapplications are based solely on scope.

**Q10: Is it acceptable propose to develop new tools or quantum computing hardware?**

A10: Proposals to the Quantum Testbed Pathfinder call should address one or both of the following themes:

1. Exploring the relationship between device architecture and application performance
2. Developing meaningful metrics for evaluating the suitability of quantum computing hardware for science applications

It is acceptable to develop new tools and/or new hardware in the context of the research performed on one or both of these themes. However, the focus of the proposal should be on the research themes. Proposals in which tool/hardware development takes precedence over research on the required themes are unlikely to be competitive.

**Q11: In preparing a full proposal, am I allowed to change the institution, key personnel, and budget from what was in my preproposal?**

A11: The Lead/Investigator, Senior/Key personnel, and submitting institution listed in your preproposal must be the same in your full proposal. You may make adjustments to the budget.

**Q12: How much weight will be placed on efforts to involve members of underrepresented groups? Should these be outlined in the Broader Impacts section of my proposal?**

A12: While DOE greatly values diversity, you are not required to include a Broader Impacts section in your proposal. Review criteria and the selection process for this funding opportunity are described in section V of the call for proposals.