

The DOE Webinar will begin shortly . . .

- **Why is there no sound?**

- Once you logged into the webinar, you were provided two options to listen to this broadcast. The first option is through your computer speakers, the second option is via dialing the phone number provided to you upon login to the webinar. If you chose to listen through your computer speakers, you may need to turn your speaker volume on or up.

- **Will DOE provide access to the recorded webinar after the meeting?**

- Yes, all those who registered will receive a link to the slides and to the recorded webinar soon after the meeting. It will also be available on the DOE SBIR/STTR web site.

- **Where can I find the Topics being discussed today?**

- This link will take you to the Funding Opportunity Announcement (FOA) page that lists the FY 2019 Phase I Release 2 Topics: <https://go.usa.gov/xUXpQ>

- **What if my question was not answered at today's webinar?**

- Please contact the point of contact that follows each subtopic in the document listed above for further clarification.
- If you have a question about the grant application process, please send us an email at: sbir-sttr@science.doe.gov or call us at (301) 903-5707.





**DOE SBIR/STTR
Phase I Release 2 Topics Webinar**

**Topics associated with the
FY 2019 Phase I Release 2
Funding Opportunity Announcement**

Topics 23-34

DOE SBIR/STTR Programs Office

November 7, 2018

TODAY'S AGENDA

Topics Introduction	DOE SBIR/STTR Programs Office – Chris O’Gwin
Topics 23-25:	Office of Fusion Energy Sciences
Topics 26-32 :	Office of High Energy Physics
Topics 33-34 :	Office of Nuclear Energy



FY 2019 Phase I Schedule

	Release 1	Release 2
Topics Issued	Monday, July 16, 2018	Monday, October 29, 2018
Webinar(s)	Week of July 30, 2018	Week of November 5, 2018
FOA Issued	Monday, August 17, 2018	Monday, November 26, 2018
Webinar(s)	Friday, August 27, 2018	Friday, November 30, 2018
Letters of Intent (LOI) Due	Tuesday, September 4, 2018	Monday, December 17, 2018
Non-responsive LOI Feedback Provided	Tuesday, September 25, 2018	Monday, January 7, 2019
Applications Due	Monday, October 15, 2018	Monday, February 4, 2019
Award Notification	Monday, January 7, 2019	Monday, April 29, 2019

Phase I Funding Opportunity Announcements

Participating DOE Programs (FY 2019)

Phase I Release 1

- Office of Advanced Scientific Computing Research
- Office of Basic Energy Sciences
- Office of Biological and Environmental Research
- Office of Nuclear Physics
- Office of Science

Phase I Release 2

- Office of Cybersecurity, Energy Security, and Emergency Response
- Office of Defense Nuclear Nonproliferation
- Office of Electricity
- Office of Energy Efficiency and Renewable Energy
- Office of Environmental Management
- Office of Fossil Energy
- Office of Fusion Energy Sciences
- Office of High Energy Physics
- Office of Nuclear Energy



Funding Opportunity Announcement (FOA) Webinar

- FY19 Phase I Release 2 FOA will be issued on **November 26th**
- Join our Mailing List – this field is on every DOE SBIR/STTR web page
 - Following the issuance of the FOA, look for an email with a link to the FOA
- Webinar with Q&A for this FOA on **November 30th**
 - Overview of the FY 2019 DOE SBIR/STTR Programs
 - Following the issuance of the FOA, look for an email announcing this webinar

CONTACT INFORMATION
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E: [Email Us](#)

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Topic Basics

- Topics are created by DOE program managers and define important technology breakthroughs needed in R&D areas that support the DOE mission
- Topics are organized by DOE Program Office
- DOE program managers are listed with each subtopic
 - Questions to DOE program managers are limited to clarification of the topic and subtopic (including references)
 - Clarification is provided to help **you** determine whether your technology fits within the topic and subtopic
 - You may communicate with these topic managers from the release of topics until the grant application due date
 - The decision to apply is **yours**



Example Topic

- Topic & Subtopic
 - You must specify the same topic and subtopic in your Letter of Intent and grant application
- Topic Header
 - Lists the maximum award amounts for Phase I & Phase II and the types of application accepted (SBIR and/or STTR)
- Program Manager
 - Each subtopic lists the responsible DOE program manager
- “Other” Subtopic
- References

12. INSTRUMENTATION FOR ADVANCED CHEMICAL IMAGING

Maximum Phase I Award Amount: \$200,000	Maximum Phase II Award Amount: \$1,100,000
Accepting SBIR Phase I Applications: YES	Accepting STTR Phase I Applications: YES

The Department of Energy seeks to advance chemical imaging technologies that facilitate fundamental research to understand, predict, and ultimately control matter and energy at the electronic, atomic, and molecular levels. The Department is particularly interested in forefront advances in imaging techniques that combine molecular-scale spatial resolution and ultrafast temporal resolution to explore energy flow, molecular dynamics, breakage, or formation of chemical bonds, or conformational changes in nanoscale systems.

Grant applications are sought in the following subtopics:

- a. **High Spatial Resolution Ultrafast Spectroscopy**
Chemical information associated with molecular-scale processes is often available from optical spectroscopies involving interactions with electromagnetic radiation ranging from the infrared spectrum to x-rays. Ultrafast laser technologies can provide temporally resolved chemical information via optical spectroscopy or laser-assisted mass sampling techniques. These approaches provide time resolution ranging from the breakage or formation of chemical bonds to conformational changes in nanoscale systems but generally lack the simultaneous spatial resolution required to analyze individual molecules. Grant applications are sought that make significant advancements in spatial resolution towards the molecular scale for ultrafast spectroscopic imaging instrumentation available to the research scientist. The nature of the advancement may span a range of approaches including sub-diffraction limit illumination or detection, selective sampling, and coherent or holographic signal analysis.

Questions – Contact: James Rustad, James.Rustad@Science.doe.gov

- b. **Time-Resolved Chemical Information from Hybrid Probe Microscopies**
Probe microscopy instruments (including AFM and STM) have been developed that offer spatial resolution of molecules and even chemical bonds. While probe-based measurements alone do not typically offer the desired chemical information on molecular timescales, methods that take advantage of electromagnetic interactions or sampling with probe tips have been demonstrated. Grant applications are sought that would make available to scientists new hybrid probe instrumentation with significant advancements in chemical and temporal resolution towards that required for molecular scale chemical interactions. The nature of the advancement may span a range of approaches and probe techniques, from tip-enhanced or plasmonic enhancement of electromagnetic spectroscopies to probe-induced sample interactions that localize spectroscopic methods to the molecular scale.

Questions – Contact: James Rustad, James.Rustad@Science.doe.gov

- c. **Other**
In addition to the specific subtopics listed above, the Department invites grant applications in other areas that fall within the scope of the topic description above.

Questions – Contact: James Rustad, James.Rustad@Science.doe.gov

References:

1. U.S. Department of Energy, 2006, Office of Science Notice DE-FG01-05ER05-30, Basic Research for Chemical Imaging, BES Chemical Imaging Research Solicitation. (<http://science.energy.gov/~media/grants/pdf/foas/2005/DE-FG01-05ER05-30.pdf>).
2. National Research Council, 2006, Visualizing Chemistry, The Progress and Promise of Advanced Chemical Imaging, National Academies Press. (http://www.nap.edu/catalog.php?record_id=11663).



Topic 23: ADVANCED TECHNOLOGIES AND MATERIALS FOR FUSION ENERGY SYSTEMS

Maximum Phase I Award Amount: \$200,000

Maximum Phase II Award Amount: \$1,100,000

Accepting SBIR Phase I Applications: YES

Accepting STTR Phase I Applications: YES

- a. Plasma Facing Components
- b. Blanket and Safety Technologies
- c. Superconducting Magnets and Materials
- d. Structural Materials and Coatings
- e. Other

Questions: Subtopics a, b, d & e – Daniel Clark, daniel.clark@science.doe.gov

Questions: Subtopic c – Barry Sullivan, barry.sullivan@science.doe.gov

Topic 24: FUSION SCIENCE AND TECHNOLOGY

Maximum Phase I Award Amount: \$200,000	Maximum Phase II Award Amount: \$1,100,000
Accepting SBIR Phase I Applications: YES	Accepting STTR Phase I Applications: YES

- a. Diagnostics
- b. Components for Heating and Fueling of Fusion Plasmas
- c. Simulation and Data Analysis Tools for Magnetically Confined Plasmas
- d. Components and Modeling Support for Validation Platforms for Fusion Science
- e. Other

Questions: Subtopic a – Matthew Lanctot , matthew.lanctot@science.doe.gov

Questions: Subtopic b & e – Barry Sullivan, barry.sullivan@science.doe.gov

Questions: Subtopic c – John Mandrekas, john.mandrekas@science.doe.gov

Questions: Subtopic d – Sam Barish, sam.barish@science.doe.gov

Topic 25: HIGH ENERGY DENSITY PLASMAS AND INERTIAL FUSION ENERGY

Maximum Phase I Award Amount: \$200,000

Maximum Phase II Award Amount: \$1,100,000

Accepting SBIR Phase I Applications: YES

Accepting STTR Phase I Applications: YES

- a. Driver Technologies
- b. Ultrafast Diagnostics
- c. High-intensity Short-pulse Laser Technologies
- d. Other

Questions: Kramer Akli, Kramer.akli@science.doe.gov

Topic 26: ADVANCED CONCEPTS AND TECHNOLOGY FOR PARTICLE ACCELERATORS

Maximum Phase I Award Amount: \$200,000

Maximum Phase II Award Amount: \$1,100,000

Accepting SBIR Phase I Applications: YES

Accepting STTR Phase I Applications: YES

- a. Metal powder development for Additive Manufacture
- b. Improved Accelerator Modeling and Control System Software
- c. High Gradient Accelerator Research and Development
- d. High-Current Cathodes
- e. High-Emissivity Coating for Targets
- f. Non-Linear Magnets for High Dynamic Aperture Lattices
- g. Novel Beam Optics for High-Intensity Hadron Synchrotrons
- h. Other

Questions: John Boger, john.boger@science.doe.gov

Topic 27: RADIO FREQUENCY ACCELERATOR TECHNOLOGY

Maximum Phase I Award Amount: \$200,000	Maximum Phase II Award Amount: \$1,100,000
Accepting SBIR Phase I Applications: YES	Accepting STTR Phase I Applications: YES

- a. Low Cost Radio Frequency Power Sources for Accelerator Application
- b. High Efficiency High Average Power RF Sources
- c. Other

Questions: Subtopic a & c – John Boger, john.boger@science.doe.gov

Questions: Subtopic b – Eric Colby, Eric.Colby@science.doe.gov

Topic 28: LASER TECHNOLOGY R&D FOR ACCELERATORS

Maximum Phase I Award Amount: \$200,000

Maximum Phase II Award Amount: \$1,100,000

Accepting SBIR Phase I Applications: YES

Accepting STTR Phase I Applications: YES

- a. Cost Reduction of Ultrafast Fiber Laser Components
- b. Novel, Scalable Techniques for Carrier-Envelope Phase Locking of Multiple Fiber Lasers
- c. Ceramic-Based Optical Materials
- d. Aperture-Scalable High Performance Diffraction Gratings
- e. Computer Modeling Based Development of High Power Coatings for Ultrafast Optics
- f. High Efficiency Spatial Mode Shaping and Control for High Power Ultrafast Lasers
- g. Other

Questions: Eric Colby, eric.colby@science.doe.gov

Topic 29: SUPERCONDUCTOR TECHNOLOGIES FOR PARTICLE ACCELERATORS

Maximum Phase I Award Amount: \$200,000	Maximum Phase II Award Amount: \$1,100,000
Accepting SBIR Phase I Applications: YES	Accepting STTR Phase I Applications: YES

- a. High-Field Superconducting Wire and Cable Technologies for Magnets
- b. Superconducting Magnet Technology
- c. Superconducting RF Cavities
- d. Cryogenic and Refrigeration Technology Systems
- e. Other

Questions: Ken Marken, ken.marken@science.doe.gov

Topic 30: HIGH-SPEED ELECTRONIC INSTRUMENTATION FOR DATA ACQUISITION AND PROCESSING

Maximum Phase I Award Amount: \$200,000

Maximum Phase II Award Amount: \$1,100,000

Accepting SBIR Phase I Applications: YES

Accepting STTR Phase I Applications: YES

- a. Radiation Hard CMOS Sensors for Detectors at High Energy Colliders
- b. Engineered Substrates for Particle Detectors at High Energy Colliders
- c. Technology for Post-Processing of Junctions for CMOS and CCD Sensors
- d. Specialty Wafers and Thick Sensors for HEP Dark Matter Detectors
- e. High Density Chip Interconnect Technology

Questions: Helmut Marsiske, helmut.marsiske@science.doe.gov

Topic 30: HIGH-SPEED ELECTRONIC INSTRUMENTATION FOR DATA ACQUISITION AND PROCESSING (Continued)

Maximum Phase I Award Amount: \$200,000

Maximum Phase II Award Amount: \$1,100,000

Accepting SBIR Phase I Applications: YES

Accepting STTR Phase I Applications: YES

- f. Radiation-Hard High-Bandwidth Data Transmission for Detectors at High Energy Colliders
- g. Custom Real Time Massively Parallel Trigger Processors for Detectors at High Energy Colliders
- h. Frequency Multiplexed DAQ Systems Motivated by Cosmic Microwave Background Detectors
- i. Electronic Tools for Picosecond (ps) Timing
- j. Other

Questions: Helmut Marsiske, helmut.marsiske@science.doe.gov

Topic 31: HIGH ENERGY PHYSICS DETECTORS AND INSTRUMENTATION

Maximum Phase I Award Amount: \$200,000

Maximum Phase II Award Amount: \$1,100,000

Accepting SBIR Phase I Applications: YES

Accepting STTR Phase I Applications: YES

- a. Lower Cost, Higher Performance Visible/(V)UV Photon Detection
- b. Technology for Large Cryogenic Detectors
- c. Cryogenic Bolometer Array Technologies
- d. Ultra-Low Mass, High-Rate Charged Particle Tracking
- e. Scintillating Detector Materials and Wavelength Shifters
- f. Ultra-Low Background Detectors and Materials
- g. Advanced Composite Materials
- h. Additive Manufacturing
- i. Other

Questions: Helmut Marsiske, helmut.marsiske@science.doe.gov

Topic 32: QUANTUM INFORMATION SCIENCE (QIS) SUPPORTING TECHNOLOGIES

Maximum Phase I Award Amount: \$200,000

Maximum Phase II Award Amount: \$1,100,000

Accepting SBIR Phase I Applications: YES

Accepting STTR Phase I Applications: YES

- a. Development of Optimal SRF Cavity Geometries for Quantum Information Systems
- b. Optimization of Fabrication Techniques for Scalable 3D SRF Structures for Quantum Information Systems
- c. Development of Low-Temperature Technologies for QIS Systems
- d. Photodetectors for Optical to Microwave Transduction of Quantum Information
- e. Other

Questions: Altaf Carim, altaf.carim@science.doe.gov

Topic 33: ADVANCED TECHNOLOGIES FOR NUCLEAR ENERGY

Maximum Phase I Award Amount: \$200,000	Maximum Phase II Award Amount: \$1,100,000
Accepting SBIR Phase I Applications: YES	Accepting STTR Phase I Applications: YES

- a. Advanced Sensors and Instrumentation (Crosscutting Research)
- b. Advanced Technologies for the Fabrication, Characterization of Nuclear Reactor
- c. Materials Protection Accounting and Control for Domestic Fuel Cycles
- d. Advanced Modeling and Simulation
- e. Plant Modernization
- f. Materials R&D

Questions: Subtopic a – Suibel Schuppner, Suibel.Schuppner@nuclear.energy.gov

Questions: Subtopic b – Frank Goldner, Frank.Goldner@nuclear.energy.gov

Questions: Subtopic c – Michael Reim, michael.reim@nuclear.energy.gov

Questions: Subtopic d – David Henderson, David.Henderson@nuclear.energy.gov

Questions: Subtopic e & f – Alison Hahn, Alison.Hahn@nuclear.energy.gov

Topic 33: ADVANCED TECHNOLOGIES FOR NUCLEAR ENERGY (Continued)

Maximum Phase I Award Amount: \$200,000	Maximum Phase II Award Amount: \$1,100,000
Accepting SBIR Phase I Applications: YES	Accepting STTR Phase I Applications: YES

- g. Component Development for Energy Conversion Systems to Support Nuclear Power Systems
- h. Advanced Methods for Manufacturing
- i. Cybersecurity Technologies for Protection of Nuclear Safety, Security, or Emergency
- j. Other

Questions: Subtopic g – Brian K. Robinson, Brian.Robinson@nuclear.energy.gov

Questions: Subtopic h – Tansel Selekler, Tansel.Selekler@nuclear.energy.gov

Questions: Subtopic i – Trevor Cook, Trevor.Cook@nuclear.energy.gov

Questions: Subtopic j – Won Yoon, Won.Yoon@nuclear.energy.gov



U.S. DEPARTMENT OF
ENERGY

Nuclear Energy

Advanced Technologies for the Fabrication and Characterization of Nuclear Reactor Fuel

Frank Goldner

Program Manager, Accident Tolerant Fuels

Janelle Eddins

Program Manager, Advanced Reactor Fuels

Madeline Feltus

Program Manager, High Temperature Gas Reactor Fuels

FY19 Phase I Release 2 Topics Webinar

November 7, 2018



Advanced Fuels Campaign: Structure and Mission

■ Mission:

- 1) Support development of **near-term Accident Tolerant Fuel (LWR)** technologies
- 2) Perform research and development on **longer-term Advanced Reactor Fuel** technologies



Accident Tolerant Fuels

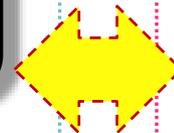
LWR fuels with improved performance and enhanced accident tolerance

Advanced Reactor Fuels

Advanced reactor fuels for enhanced resource utilization

Capability Development to Support Fuel Development and Qualification

Advanced characterization and PIE techniques
Advanced in-pile instrumentation
Separate effects testing for model development/validation
Transient testing infrastructure



Fuels Product Line
Multi-scale, multi-physics, fuel performance modeling and simulation

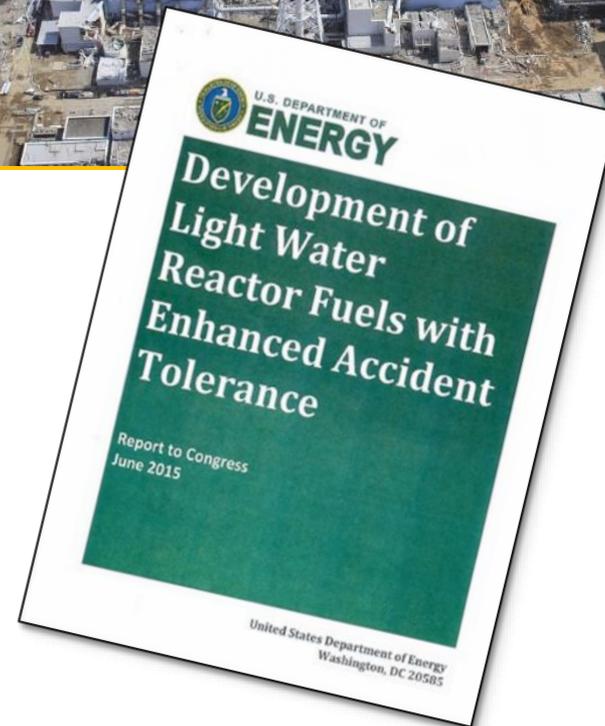


Congressional Direction and Development Plan on ATF

Following the accident at Fukushima, Congress directed the Department of Energy to begin developing fuels with enhanced accident tolerance that can be used in existing light water reactors.

The Development Plan:

- Defines the general attributes of accident tolerant fuel
- Lays out an aggressive 10-year schedule starting in 2012
- Establishes the goal of inserting lead fuel rods/assemblies in an operating commercial light water reactor by **2022**





Industry-led Development of ATF Concepts

■ Framatome

- Cr-coated M5 cladding
- Doped UO₂ for improved thermal conductivity and performance
- SiC cladding



■ General Electric

- Coated Zr cladding
- Iron-based cladding (FeCrAl)
- ODS variants for improved strength

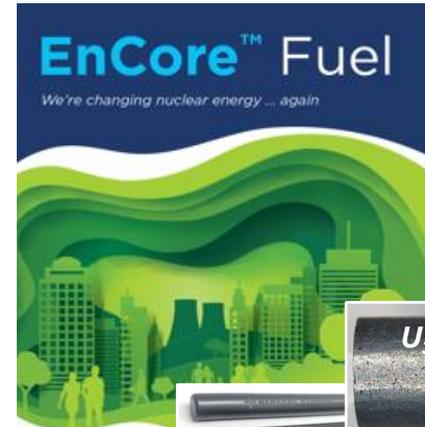


GE imagination at work



■ Westinghouse

- Cr-coated Zirlo cladding
- SiC cladding
- Alternative fuels with improved thermal conductivity and high density





Advanced Reactor Fuel Development

■ Metallic Fuels for Closed Fuel Cycles and Actinide Transmutation

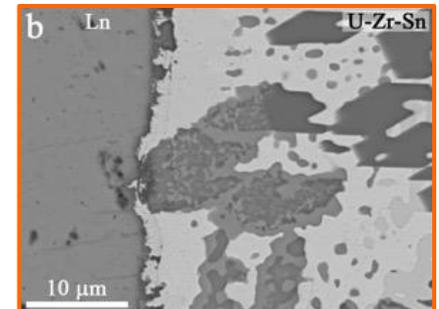
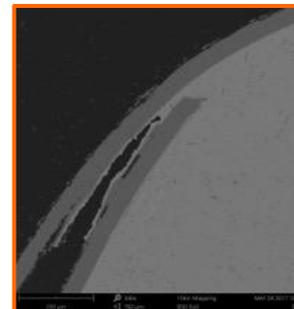
■ Fuels for Once-through Fast Spectrum Reactors

- Na-free, annular metallic fuel concepts
- Ultra-high burnup for enhanced resource utilization
- Non-traditional applications such as microreactors



■ Fuels for High Temperature, Fast Spectrum Reactors

- Higher cladding temperature/performance (ODS alloys)
- Metallic fuels with additives and/or cladding coatings/liners
- UN, UO₂ for LFR UC for GFR



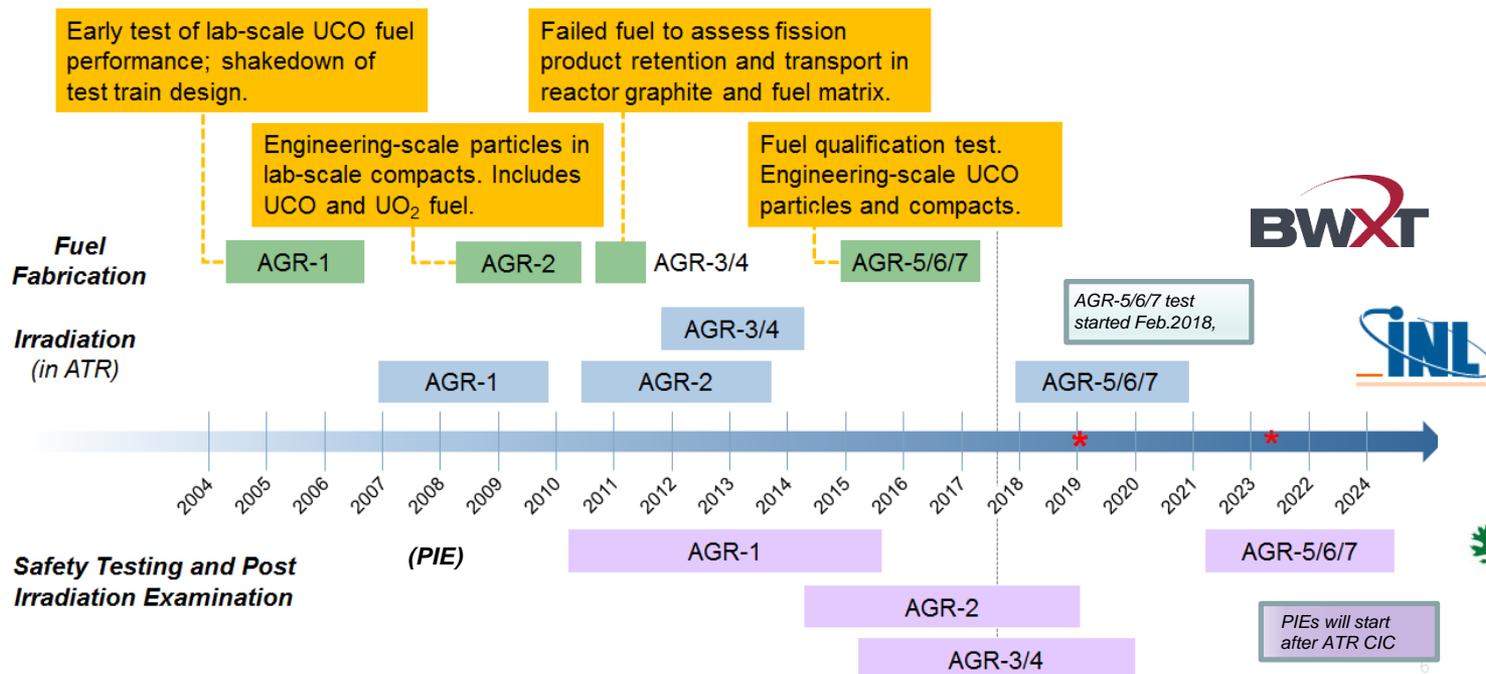
AFC Priorities: FY19 Forward

Nuclear Energy

- 1) Support the industry-led development of Accident Tolerant Fuel (ATF) technologies with improved reliability and performance under normal operations and enhanced tolerance during hypothetical accident scenarios, with implementation of lead test rods/assemblies of one or more ATF concepts in commercial reactor(s) by 2022.
- 2) Lead research and development on innovative fuel and cladding technologies for applications to future advanced reactors, especially fast-spectrum reactors, including reactors that utilize both once-through and recycle scenarios.
- 3) Continue the development and demonstration of the science-based approach applied to fuel development, contributing to the establishment of state-of-the-art R&D infrastructure necessary to accelerate the development of advanced fuel concepts.
- 4) Collaborate with NEAMS on the development and validation of multi-scale, multi-physics, and increasingly predictive fuel performance models and codes.

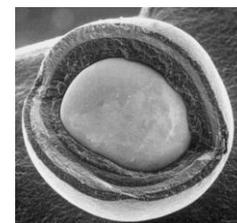


Advanced Gas Reactor TRISO Fuel Qualification Program



AGR TRISO Program Goals:

- Re-establish U. S. TRISO fuel production capability
- Demonstrate TRISO irradiation performance (good fission product retention) during normal operations and accident conditions (1600 C).
- Submit TRISO program test results in licensing topical reports to NRC that demonstrate UCO TRISO fuel is qualified for generic High Temperature Gas Reactor designs (2026)



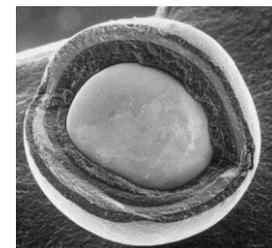


Nuclear Energy

- Continue AGR-5/6/7 irradiation test of vendor-fabricated prototypic-scale TRISO compacts (2019-2022)
- First Limited Scope Topical Fuel Report on TRISO Fuel Performance submitted to NRC (2019)
- Complete PIE and final report of AGR-2 tests of testing TRISO particles made at prototypic production scale (2020)
- Complete PIE and final report of AGR-3/4 experiments containing designed-to-fail TRISO particles expected to fail during irradiation that provide fission product transport data (2021)
- Complete irradiation of final AGR experiment (AGR-5/6/7) which serves as a TRISO fuel margin and qualification test based on selected fuel specifications (2022)
- Commence PIE, heat up experiments, and air/moisture ingress safety tests of the final AGR experiment (AGR-5/6/7) compacts (2023)
- Submit TRISO fuel performance, PIE and safety test results in licensing topical reports to NRC to demonstrate TRISO fuel is qualified for generic High Temperature Gas Reactor designs (2026)

HOWEVER some TRISO-fueled reactor designs use PEBBLES, not compacts.

This SBIR/STTR call seeks automated PEBBLE TRISO fuel fabrication and new NDE methods.





■ AFC National Technical Director:

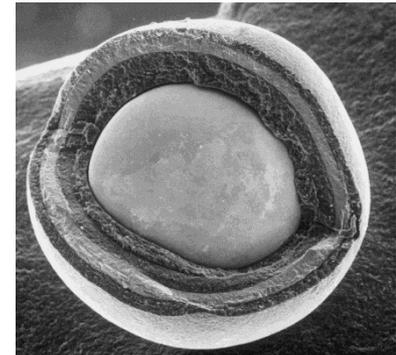
- Steve Hayes (INL), steven.hayes@inl.gov

■ AGR TRISO Technical Director:

- Paul Demkowicz (INL), paul.demkowicz@inl.gov

■ Federal Program Managers:

- Frank Goldner, frank.goldner@nuclear.energy.gov
- Janelle Eddins, janelle.eddins@nuclear.energy.gov
- Madeline Feltus, madeline.feltus@nuclear.energy.gov

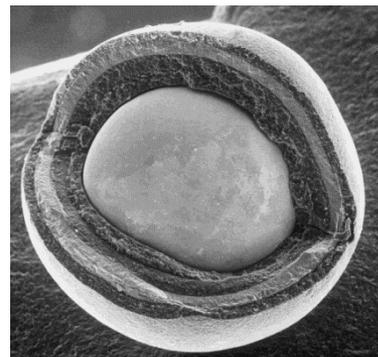




U.S. DEPARTMENT OF
ENERGY

Background Information

Nuclear Energy





Advanced Nuclear Fuel Technologies

Home | Advanced Nuclear Fuel Technologies | Advanced Fuels Program | Accident-Tolerant Fuels

The Department of Energy directs programs that conduct research and development (R&D) activities for advanced nuclear fuels that will continue to improve the operation of the current fleet of light water reactors and will be used in the next generation of reactors. The safe, reliable and economic operation of the nation's nuclear power reactor fleet has always been a top priority for the nuclear industry. Continual improvement of technology, including advanced materials and nuclear fuels, remains central to industry's success.

Advanced Fuels Program | Accident Tolerant Fuels | Light Water Reactor Sustainability | Transient Reactor Test Facility | Department of Energy Office of Nuclear Energy

Accident Tolerant LWR Fuel Information Sheet

Enhanced Accident Tolerant Fuels for Light Water Reactors

Development Goal: Demonstrate performance by inserting a lead test rod or lead test assembly into a commercial power reactor by 2022 with deployment in the U.S. light water reactor fleet to follow within 20 years.

ATF Program Goals: The overall goal of ATF development is to identify alternative fuel system technologies to enhance the safety, competitiveness, and economics of commercial nuclear power. The development of an enhanced fuel system supports the sustainability of nuclear power, allowing it to continue to generate clean, low CO₂ emitting electrical power in the United States. Subcooled accident tolerant fuels would reduce loss of active cooling in the reactor core for a considerably longer period of time than the current fuel systems. (Continued)

Current LWR Fuel: Today's U.S. commercial LWR fleet uses uranium dioxide (UO₂) ceramic alloy fuel systems to provide 70 percent of the nation's clean energy. Decades of industry research and operational experience have produced an extensive database supporting the performance of LWR fuel during normal power operations and during postulated accident conditions. The nuclear power industry is focused on continuous improvement and reliable operation.

Enhanced Cladding Properties:

- Resistance to clad fracture
- Robust geometric stability
- Thermal shock resistance
- Higher cladding melt temperature
- Minimized fuel-cladding interactions

Enhanced Retention of Fission Products:

- Gaseous fission products
- Solid/liquid fission products

Enhanced Tolerance to Loss of Active Core Cooling

Improved Reaction Kinetics with Steam:

- Increased level of oxidation
- Lower oxidation rate
- Reduced hydrogen production or other conductive gases
- Reduced hydrogen embrittlement of cladding

Improved Fuel Properties:

- Lower fuel operating temperatures
- Minimized cladding internal oxidation
- Minimized fuel relocation/deposition
- Higher fuel melt temperature

Key contributions to establishing accident-tolerant fuel attributes

U.S. Department of Energy - Nuclear Energy



Recent Advanced Fuels Campaign and AGR TRISO Documents

OSTI Document Links of Interest:

Overview of Accident Tolerant Fuel Program

<http://www.osti.gov/scitech/servlets/purl/1130553>

Accident Tolerant Fuel Performance Metrics

<http://www.osti.gov/scitech/servlets/purl/1129113>

INL Document Links of Interest:

Advanced Fuel Cycle Web Site:

<https://nuclearfuel.inl.gov/afp/SitePages/Home.aspx>

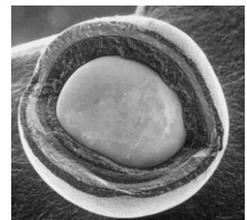
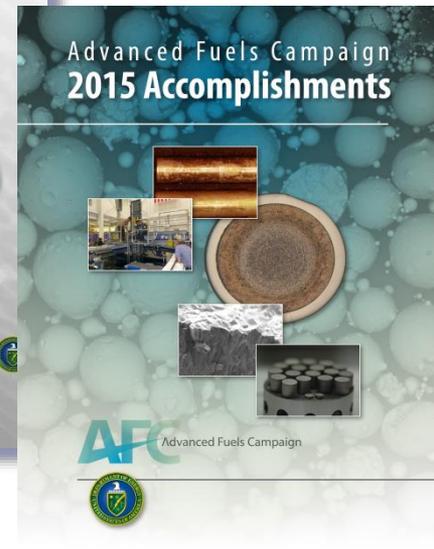
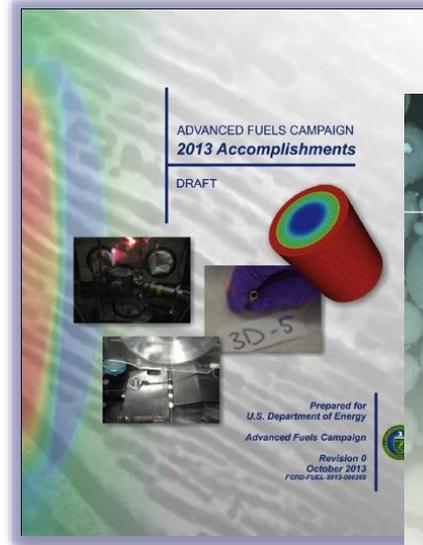
2017 Accomplishments Report

<https://nuclearfuel.inl.gov/afp/AFC%20Accomplishments%202017/index.aspx?page=1>

AGR TRISO 2018 Technical Plan Document:

[https://art.inl.gov/ART%20Document%20Library/
INL%20ART%20TDO%20Documents/PLN3636_Technical_Program_Plan.pdf](https://art.inl.gov/ART%20Document%20Library/INL%20ART%20TDO%20Documents/PLN3636_Technical_Program_Plan.pdf)

AGR TRISO ART Program Web Site: <https://art.inl.gov/SitePages/ART%20Program.aspx#4>



Topic 34: ADVANCED TECHNOLOGIES FOR NUCLEAR WASTE

Maximum Phase I Award Amount: \$200,000	Maximum Phase II Award Amount: \$1,100,000
Accepting SBIR Phase I Applications: YES	Accepting STTR Phase I Applications: YES

- a. Spent Fuel and Waste Science and Technology, Disposal R&D
- b. Spent Fuel and Waste Science and Technology, Storage & Transportation R&D
- c. Spent Fuel and Waste Science and Technology, Other R&D

Questions: Subtopic a – Mark Tynan, Mark.Tynan@doe.gov

Questions: Subtopic b – John Orchard, John.Orchard@doe.gov

Questions: Subtopic c – Prasad Nair, Prasad.Nair@doe.gov

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