U.S. DEPARTMENT OF ENERGY | Office of Science

Nuclear Physics SBIR/STTR Program :

SBIR/STTR Exchange Meeting
August 6-7, 2015
Gaithersburg, MD

M. Farkhondeh, PhD

Program Manager
Advanced Technology Research and Development
DOE Office of Science
Office of Nuclear Physics

Contents:

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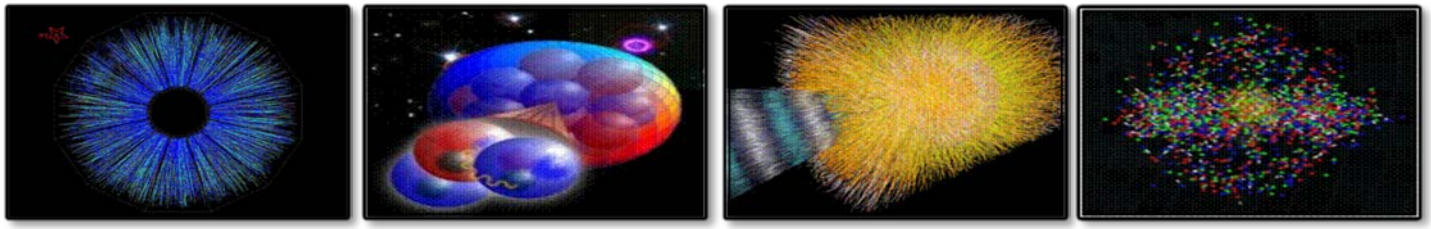
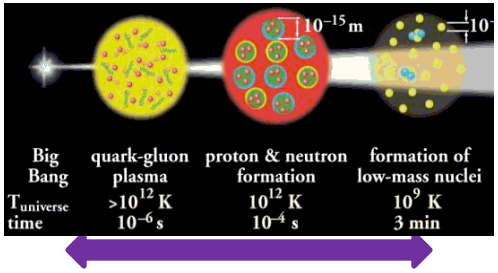
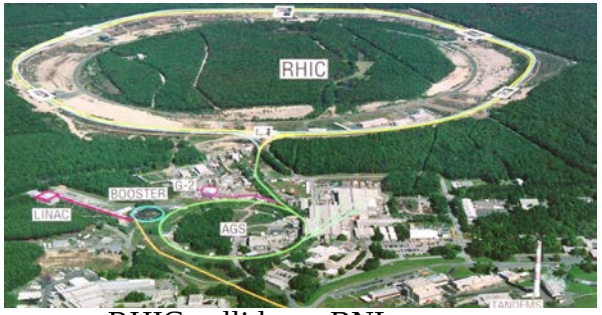
Mission Statement Office of Nuclear Physics

Mission: To discover, explore and understand all forms of nuclear matter; to understand how the fundamental particles, quarks and gluons, fit together and interact to create different types of matter in the universe, including those no longer found naturally.





Nuclear Physics



RHIC collider at BNL.

CEBAF at TJNAF

ATLAS at ANL

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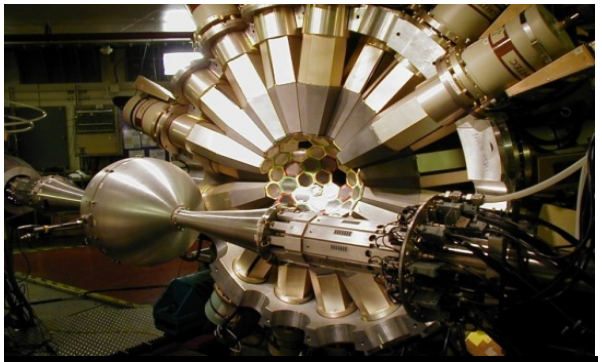
At Present NP Operates three National User Facilities

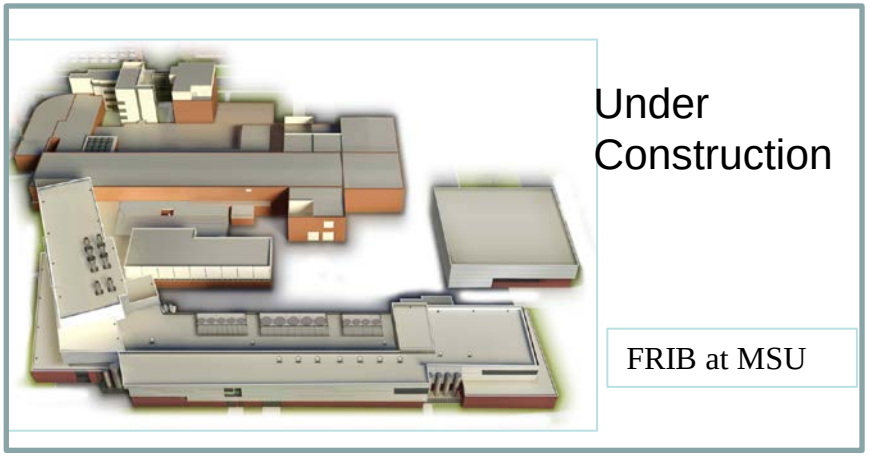
"Microscopes" capable of groundbreaking research

Relativistic Heavy Ion Collider

Continuous Electron Beam Accelerator Facility



Argonne Tandem Linac Accelerator System



NP Isotope Program Mission

The **mission** of the DOE Isotope Program is threefold:

- Produce and/or distribute radioactive and stable isotopes that are in short supply, associated byproducts, surplus materials and related isotope services.
- Maintain the infrastructure required to produce and supply isotope products and related services..

Isotope Production Facility (LANL)

Brookhaven Linac Isotope Producer

- Conduct R&D on new and improved isotope production and processing techniques which can make available new isotopes for research and applications.

This can relate to SBIR Isotope Topic

SBIR/STTR Exchange Meeting

- NP is seeking to effectively assess the performance of NP supported SBIR/STTR projects in contributing to the NP mission and goals. Started in FY2010, the Exchange meeting is designed to serve that purpose and to achieve the following goals:
  - ➢To **provide a platform** for small businesses to present the status of NP-supported Phase II grant work to the NP community and Federal Program Managers.
  - ➢ To offer an opportunity to **exchange information** regarding the **companies' capabilities** and the technical needs of the NP programs.
  - ➢ To **strengthen the ties** of the SBIR/STTR businesses **with the community** and enhance the possibilities for commercialization.

- For this year's meeting, all Phase II awardees at the end of Year -1,Year-2 (started in FY013 and 14) and awardees still active under "no cost extension" are invited. A total of 26 SBIR/STTR presentations will be given in 2 days.

New this year →

- FY 2015 Phase II awardees are invited as participants only and will be invited to present in next year's meeting.
- Also included are four talks related to the NP user facilities, their capabilities and needs in view of the NP SBIR program.
- A talk by DOE SBIR/STTR Program office representative at the end of the meeting.

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2015 Exchange Meeting Agenda (Day 1)

August 6-7, 2015

Hilton Washington, DC North, Gaithersburg, Maryland

Meeting Agenda-Day 1

	Time	Dur. (min)	Presentation Title	Speaker	Organization	NP SBIR/ STTR Topic	Grant Status
	Thursday, August 6, 2015						
	8:30 AM	5	Welcome and Introductory Remarks	Gillo, Jehanne	DOE, Office of Nuclear Physics		
	8:35 AM	35	NP SBIR/STTR Program Overview	Farkhondeh, Manouchehr	DOE, Office of Nuclear Physics		
1	9:10 AM	25	Polyhedral User Mapping Assistant and Visualizer (Puma-V)	Langston, Harper	Reservoir Labs, Inc., NY	Software/STTR	End Year 1
2	9:35 AM	25	Non-Invasive Beam Monitor, Fast Kicker, Bunch Shaper and Photogun	Roberts, Brock	Electrodynamic, NM	Accelerator	End Year 1
	10:00 AM	25	Coffee Break				
3	10:25 AM	25	Radiation Resistant Magnetic Field Sensor	Kochergin, Vladimir	MicroXact, Inc., VA	Instrumentation	End Year 1
	10:50 AM	35	NP Low Energy Facilities and the SBIR/STTR Program	Macchiavelli, Augusto	Lawrence Berkeley National Laboratory	Instrumentation	
4	11:25 AM	25	Development of a Superconducting RF Harmonic Cavity For eRHIC	Boulware, Chase/ Grimm, Terry	Niowave, Inc., MI	Accelerator	End Year 1
5	11:50 AM	25	Modular Planar Germanium Detector Systems For High Resolution Gramma-Ray Spectroscopy And Tracking Arrays	Hull, Ethan	PHDs Co., TN	Instrumentation	End Year 1
	12:15 PM	60	Lunch Break (on your own)				
6	1:15 PM	0	Perm-Pump: A Power-Free Hydrogen-Extraction Permeation Pump for XHV	Mulhollan, Gregory	Saxet Surface Science, TX	Accelerator	Talk Cancelled
	1:15 PM	35	TJNAF Facility and the SBIR/STTR Program	Pilat, Fulvia	Thomas Jefferson National Accelerator Facility	Accelerator	
7	1:50 PM	25	Low Cost, High-Density Digital Electronics for Nuclear Physics	Skulski, Wojciech	SkuTek Instrumentation, NY	Electronics	End Year 1
8	2:15 PM	25	GaAsSb/AlGaAsP Superlattice "with DBR" Polarized Electron Source	Chen, Yiqiao	SVT Associates, Inc., MN	Accelerator	End Year 1
9	2:40 PM	25	Digital Silicon Photomultiplier Array Readout Integrated Circuits	Lee, Adam	Voxtel, Inc., OR	Instrumentation	End Year 1
	3:05 PM	20	Coffee Break				
10	3:25 PM	25	Semiconductor Detectors with Optimized Proximity Signal Readout	Asztalos, Stephen	XIA LLC, CA	Instrumentation	End Year 1
11	3:50 PM	25	Low-Latency Ultra-High Capacity Holographic Data Storage Archive Library	Anderson, Ken	Akonia Holographics, LLC, CO	Software /Fast Track	End Year 1
12	4:15 PM	25	Thin Diamond for Time-of-Flight Detectors	Tabeling, Joseph	Applied Diamond, Inc., DE	Instrumentation	End Year 2 /NCE
13	4:40 PM	25	Ferroelectric Based High Power Components for L-Band Accelerator Applications	Jing, Chunguang/Kanareykin, Alex	Euclid Techlabs, LLC, OH	Accelerator	End Year 2 /NCE
	5:05 PM		Adjourn				

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2012 Exchange Meeting Agenda (Day 2)

Meeting Agenda-Day 2

	Time	Dur. (min)	Presentation Title	Speaker	Organization	NP SBIR/ STTR Topic	Grant Status
	Friday, August 7, 2015						
14	8:30 AM	25	Digital SQUID Magnetometers for Read-out of Detectors and Magnetic Particles	Radparvar, Masoud	Hypres, Inc., NY	Instrumentation	End Year 2 /NCE
15	8:55 AM	25	GaAsSb/ALGaAs Superlattice High-Polarization Electron Source with DBR	Chen, Yiqiao	SVT Associates, Inc., MN	Accelerator	End Year 2 /NCE
16	9:20 AM	25	Development of MgB2 Superconducting Coils for Nuclear Physics Applications	Rindfleisch, Matthew	Hyper Tech Research, Inc., OH	Accelerator	End Year 2 /NCE
17	9:45 AM	25	Production of Commercial High Specific Activity Sn-117M Radiochemical and Chelates	Stevenson, Nigel	Clear Vascular, Inc., TX	Isotope	End Year 2
18	10:10 AM	25	Commercial Superconducting Electron Linac for Radioisotope Production	Boulware, Chase/ Grimm, Terry	Niowave, Inc., MI	Isotope	End Year 2
	10:35 AM	30	Coffee Break				
	11:05 AM	35	RHIC Facility and the SBIR/STTR Program	Blaskiewicz, Mike	BNL		
19	11:40 AM	25	Refractory Oxides with Tunable Porosity and Geometry as Versatile Fast-Release Solid Catchers for Rare Isotopes	Sampathkumaran, Uma	InnoSense LLC, CA	Accelerator	End year 2
20	12:05 PM	25	Advance Additive Manufacturing Method for SRF Cavities of Various Geometries	Frigola, Pedro /Ruelas, Marcos	Radiabeam Technologies, LLC., Santa Monica, CA	Accelerator	End year 2
	12:30 PM	60	Lunch Break (on your own)				
21	1:30 PM	25	High Radiation Environment Nuclear Fragment Separator Magnet	Kahn, Stephen	Muons, Inc., IL	Accelerator	No Cost Extension
	1:55 PM	35	NP Isotope Program and Facilities and the SBIR/STTR Program	John, Kevin	Los Alamos National Laboratory		
22	2:30 PM	20	Integrated Modeling Tool for Electron-Beam Based Ion-Sources	Kim, Jin-Soo	FAR-TECH, Inc., CA	Accelerator	No Cost Extension
23	2:50 PM	20	High Density Low Cost Readout Electronics for Large Scale Radiation Detectors; Hui Tan	Tan, Hui	XIA LLC, Hayward, CA	Electronics	No Cost Extension
	3:10 PM	15	Coffee Break				
24	3:25 PM	20	High-Performance Plasma Panel Based Micropattern Detector	Friedman, Peter	Integrated Sensors, LLC, OH	Instrumentation	No Cost Extension
25	3:45 PM	20	Thin-Window P-Type Point-Contact Germanium Detectors for Rare Particle Detection	Hull, Ethan	PHDs Co., Knoxville, TN	Instrumentation	No Cost Extension
26	4:05 PM	20	Novel Polishing Process to Fabricate Ultra Low Thickness Variation Diamond Substrates for Next Generation Beam Tracking Detectors	Arjunan, Arul	Sinmat Inc., Gainesville, FL	Instrumentation	No Cost Extension
	4:25 PM	35	Update on the Department of Energy SBIR/STTR Program, Q/A	Hebron, Carl	DOE, SBIR/STTR Office		
	5:00 PM		Adjourn				

SBIR/STTR

SBIR: Small Business Innovation Research STTR: Small Business Technology TRansfer.

- SBIR: Set-aside program for small business (SB) to engage in federal Research and Development (R&D) with potential for commercialization. (Participations: SB: minimum 66 % for Phase I and 50% for Phase II, RI: optional)
- STTR: Set-aside program to facilitate cooperative R&D between small business and U.S. research institutions (RI) with potential for commercialization. (Participations: SB: minimum 40%, RI: minimum 30%)
- "Both": submitted for consideration as SBIR or STTR (both). Must satisfy the minimum participation requirements listed above for both SBIR and STTR.
- Fast Track: A combined and accelerated Phase I and Phase II.

➢ A Congressionally-mandated programs, funded by a small percentage of the extramural R&D budget set aside within each DOE technical program that participates.

➢ 2012 reauthorization bill has provided funding for the program until September 2017

	FY2013	FY2014	FY2015	FY2016	FY2017	FY2018
SBIR	0.0270	0.028	0.029	0.0300	0.0320	0.0320
STTR	0.0035	0.004	0.004	0.0045	0.0045	0.0045
Total	**3.05%**	**3.20%**	**3.30%**	**3.45%**	**3.65%**	**3.65%**

Current SBIR/STTR Status

Phase I

Grant	Max award ($k)	Small Business (Level of Effort)	Research Institution (Level of Effort)
SBIR	150	Min 66%	Optional
STTR	150	Min 40%	Min 30%

Phase II

Grant	Max award ($k)	Small Business (Level of Effort)	Research Institution (Level of Effort)
SBIR	1000	Min 50%	Optional
STTR	1000	Min 40%	Min 30%

Fast Track

Combined Phase I and Phase II, submitted and Reviewed with Phase I competition.

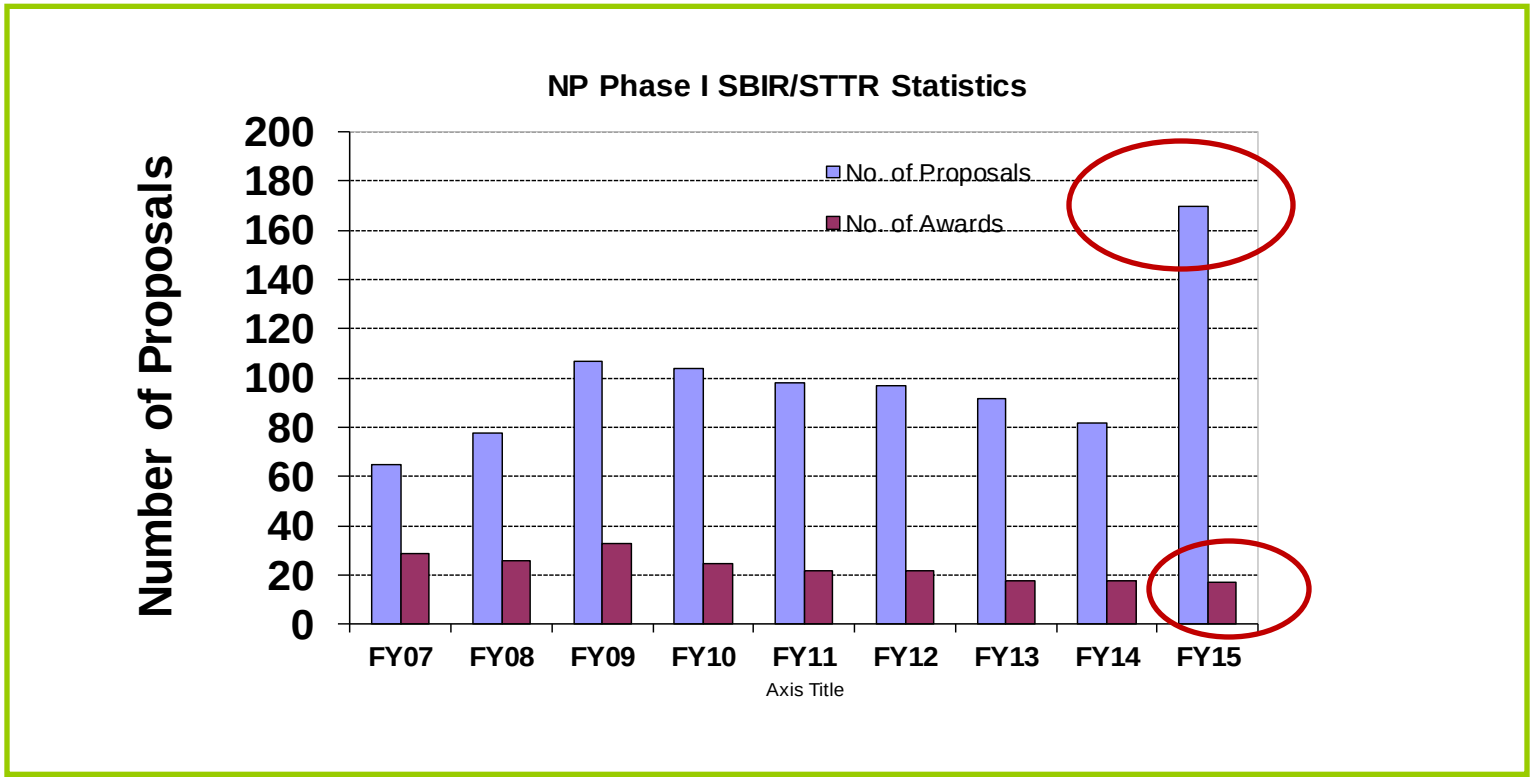
SBIR/STTR 2012 Reauthorization Bill

Highlights:

- Maximum SBIR and STTR award amounts are now at $150k and $1000k
- Increases the SBIR program allocation from 2.5 to 3.2 percent and the STTR allocation from 0.3 percent to 0.45 percent over the course of the reauthorization,
- Reauthorization legislation allows companies to switch between SBIR and STTR programs when they apply for Phase II
- Requires most agencies to complete their review process for applicants within 90 days (or 180 days if the agency is granted an extension by the SBA).
- More emphasize on commercialization and performance metric.
- More detail on **Mr. Carl Hebron** talk tomorrow afternoon

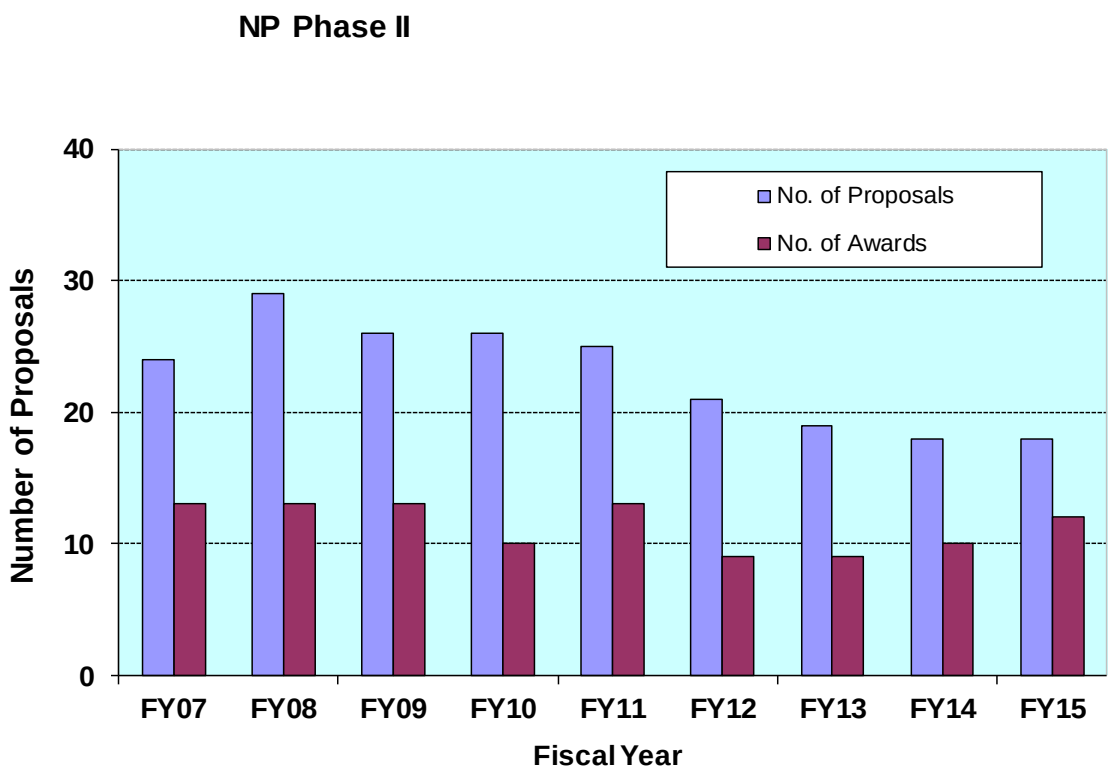
NP Phase I SBIR/STTR Applications and Awards

- NP received a Total of **270** LOI and **170** phase I proposals in FY 2015, with **1188** review requests for a total of **~ 510** mail reviews. Total of **18** proposals funded.
- There was a huge increase of applications in FY15 and thanks to Michelle Shinn for her continuous help and to Topic Associates (TA) for their help with various degrees of involvement.



NP Phase II SBIR/STTR Applications and Awards

The increases in maximum SBIR award amounts started in FY 2011 has affected number of phase II awards that can be supported.



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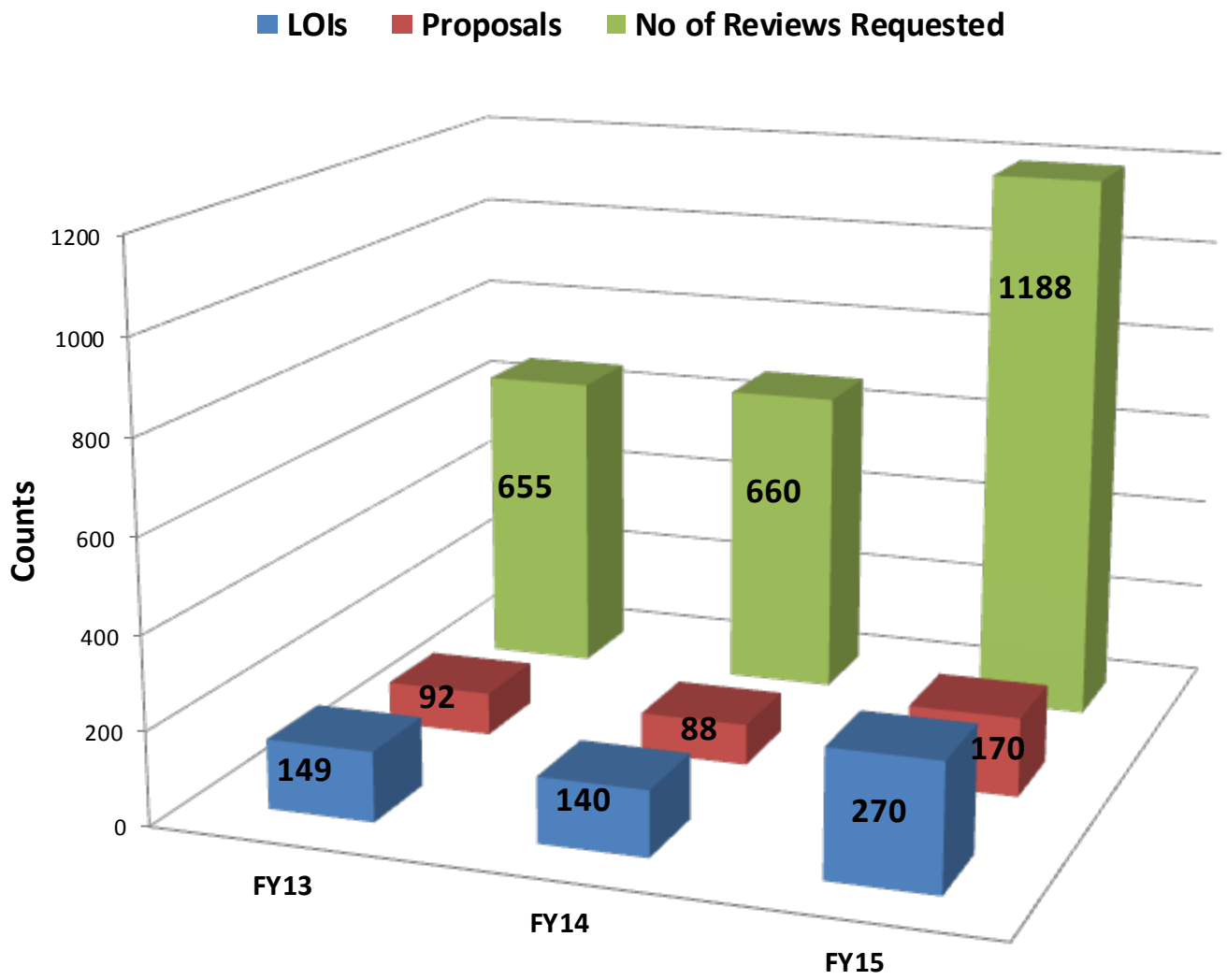
NP Phase I SBIR/STTR LOIs and Applications (FY2015)



In FY15: HEP moved out of DOE Release 1 FOA

- Also No. of LOI and proposals nearly doubled.

NP SBIR/STTR Topics for FY 2016

- Software and Data Management
- Electronics Design and Fabrication
- Accelerator Technology
- Instrumentation, Detection Systems and Techniques
- Isotope Science and Technology

- Considerable Revisions of subtopics this year in various topics.
- Funding Notes: There is no fixed set aside for each topic. Proposals from all 5 topics compete with each other and highly ranked applications are funded.

NP Topic 1

Software and Data Management

a. Large Scale Data Storage (this subtopic is dropped for FY2016)
b. Large Scale Data Processing and Distribution
c. Grid and Cloud Computing (this subtopic is dropped for FY2016)
d. Software-driven Network Architectures for Data Acquisition
e. Heterogeneous Concurrent Computing
f. Other

Phase I

FY15	SBIR	STTR /Both	Fast Track	Total	LOI
# of Applications	8	0	0	8	14
# of Awards	0	0	0	0	N/A

First Fast Track grant

FY14	SBIR	STTR /Both	Fast Track	Total	LOI
# of Applications	7	0	(1)	7	14
# of Awards	0	0	1	1	N/A

NP Topic 2

Electronics Design and Fabrication

a. Advances in Digital and high-density analog Electronics
b. Circuits
c. Advanced Devices and Systems
d. Next Generation Active Pixel Sensors
e. Manufacturing and Advanced Interconnection Techniques
f. Other

Phase I

FY15	SBIR	STTR /Both	Fast Track	Total	LOI
# of Applications	18	2	0	20	37
# of Awards	1	1	0	2	N/A

FY14	SBIR	STTR /Both	Fast Track	Total	LOI
# of Applications	8	0	0	8	22
# of Awards	1	0	0	1	N/A

NP Topic 3 Accelerator Technology

a. Materials and Components for Radio Frequency Devices
b. Radio Frequency Power Sources
c. Design and Operation of Radio Frequency Beam Acceleration Systems
d. Particle Beam Sources and Techniques
e. Polarized Beam Sources and Polarimeters
f. Charge Strippers for Heavy Ion Accelerators
g. Rare Isotope Beam Production Technology
h. Accelerator Control and Diagnostics
i. Magnet development for future Electron-Ion Colliders (EIC)
j. Accelerator systems associated with the capability to deliver heavy-ion beams to multiple users
k. Other

Phase I

FY15	SBIR	STTR /Both	Fast Track	Total	LOI
# of Applications	77	10	0	87	120
# of Awards	10	1	0	11	

FY14	SBIR	STTR/Both	Fast Track	Total	LOI
# of Applications	28	8	0	36	50
# of Awards	6	1	0	7	

Instrum., Detection Sys. and Techniques

NP Topic 4:

a. Advances in Detector and Spectrometer Technology
b. Development of novel gas and solid-state detectors
c. Technology for Rare Decay and Rare Particle Detection
d. High Performance Scintillators, Cherenkov Materials and Other Optical Components
e. Specialized Targets for Nuclear Physics Research
f. Technology for High Radiation environment.
g. Other

Phase I

FY15	SBIR	STTR/ Both	Fast Track	Total	LOI
# of Applications	35	6	(2)	41	82
# of Awards	4	0		4	N/A

FY14	SBIR	STTR/ Both	Fast Track	Total	LOI
# of Applications	19	6	(1)	25	38
# of Awards	6	2		8	N/A

NP Topic 5

Isotope Science and Technology

a. Novel or improved production techniques for radioisotopes or stable isotopes

b. Improved radiochemical separation methods for preparing high-purity radioisotopes

c. Other

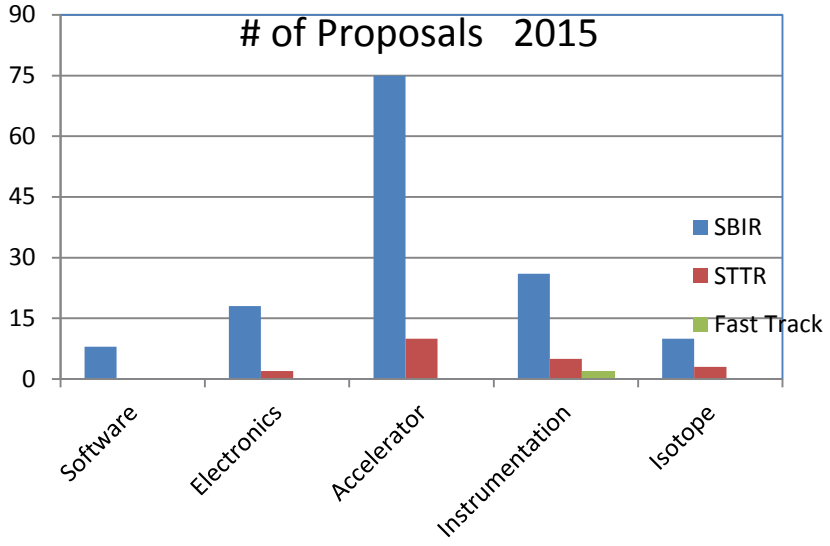
Phase I

FY15	SBIR	STTR /Both	Fast Track	Total	LOI
# of Applications	10	3	(0)	13	22
# of Awards	0	1	0	1	N/A

FY14	SBIR	STTR /Both	Fast Track	Total	LOI
# of Applications	8	1	0	9	16
# of Awards	1	0	0	1	N/A

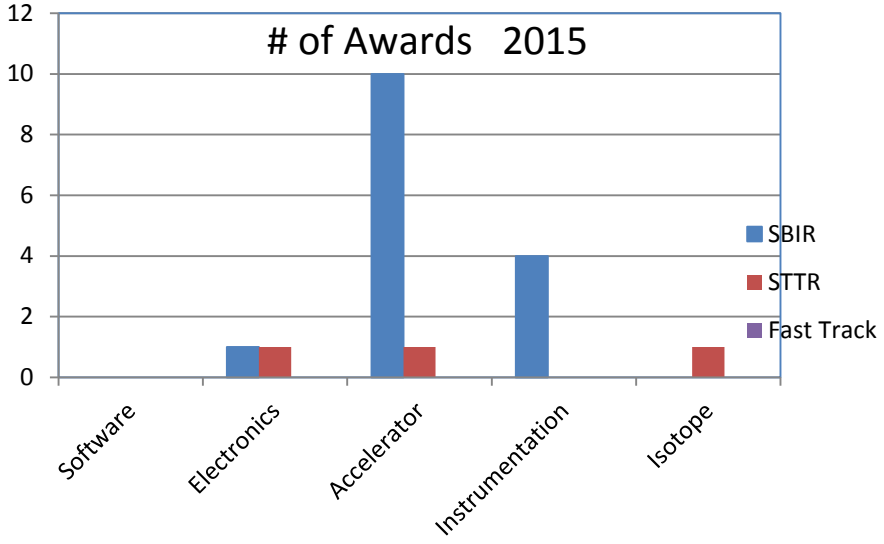
NP SBIR/STTR Statistics 2015

2015 Proposals



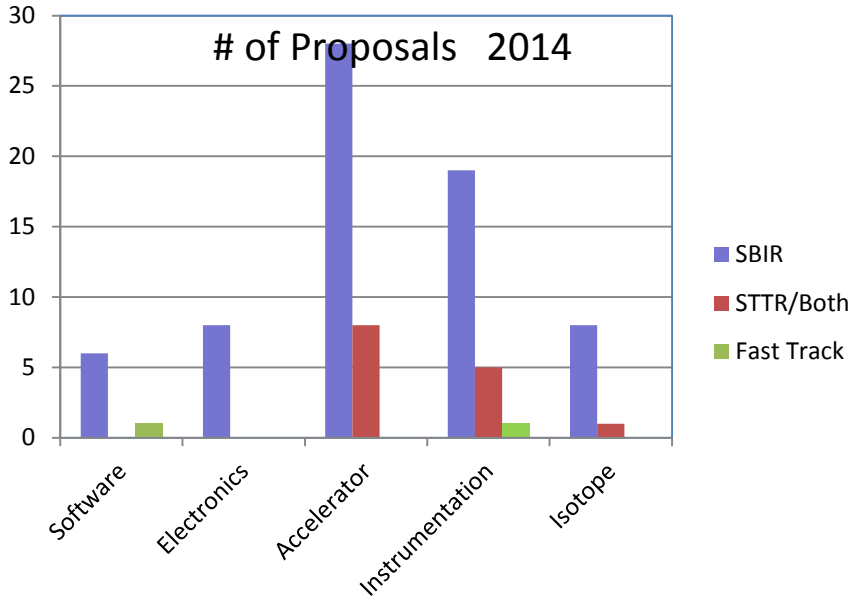
Phase I

2015 Awards



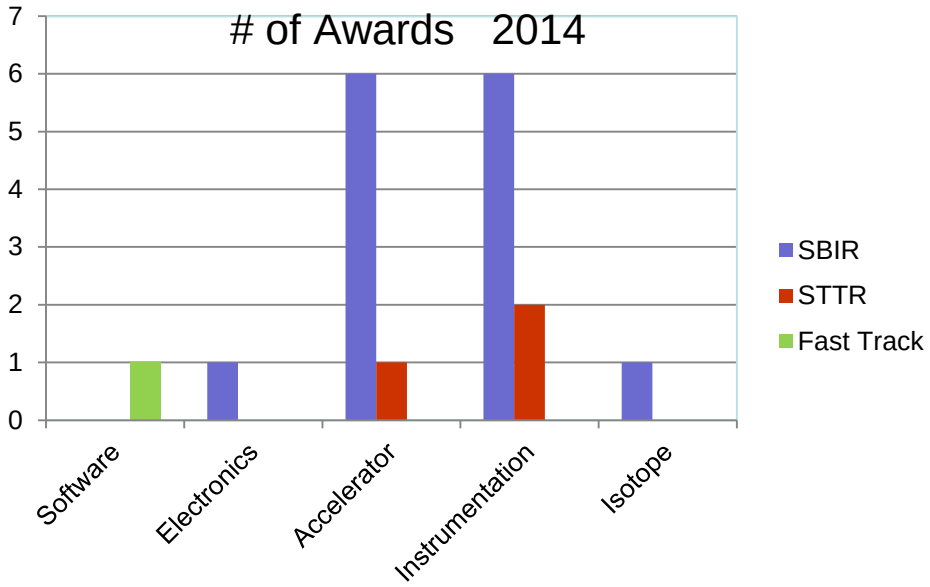
NP SBIR/STTR Statistics 2014

2014 Proposals



Phase I

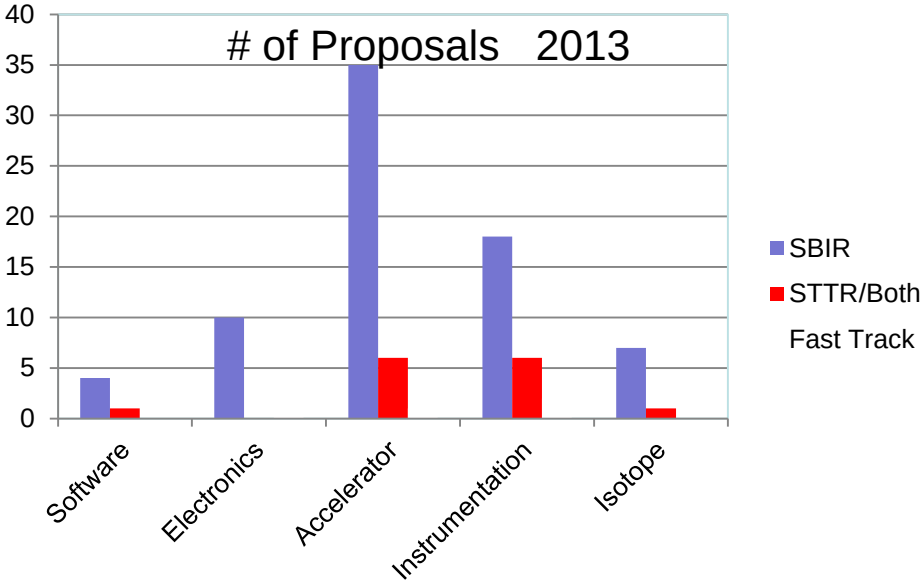
2014 Awards



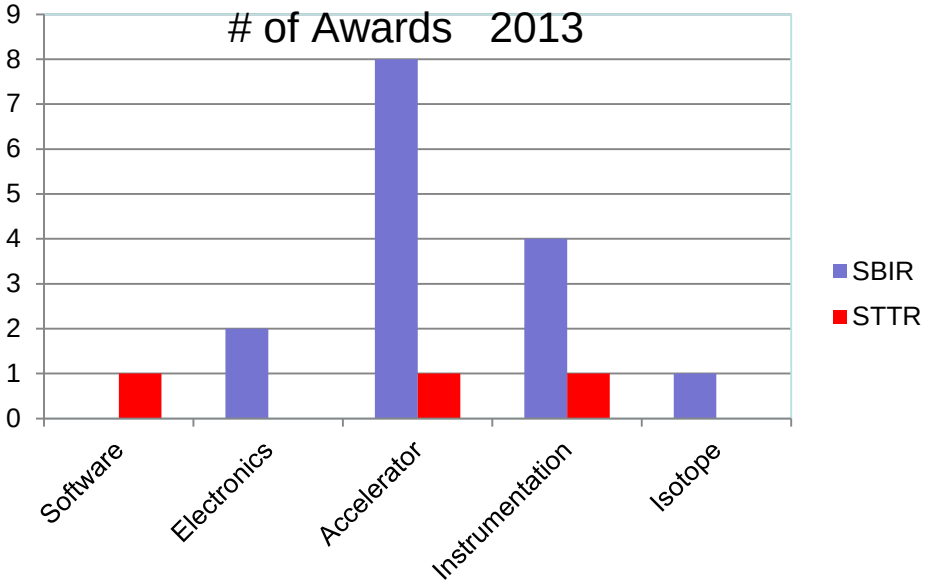
NP SBIR/STTR Statistics 2013

2013 Proposals

Phase I



2013 Awards



NP yearly SBIR/STTR topic development process

- Start with last year published topic document and make initial revisions based on year-round NP community input and Program Manager observations,
- Request input for each topic from individuals within the NP community,
- Collect and implement all inputs on existing subtopics. Add and/or delete subtopics as necessary,
- Submit the revised topics to DOE SBIR/STTR office; and
- After further formatting iteration with the SBIR/STTR office, the solicitation is published as a Funding Opportunity Announcement (FOA) around the beginning of September

Sequential II A and IIB

2012 SBIR/STTR Reauthorization permitted agencies to issue sequential Phase II awards

- 15 USC 638 (ff) Additional SBIR and STTR awards. (1) Express authority for awarding a sequential Phase II award. A small business concern that receives a Phase II SBIR award or a Phase II STTR award for a project remains eligible to receive 1 additional Phase II SBIR award or Phase II STTR award for continued work on that project.

- Only Phase II awardees are eligible
- Only 1 additional Phase II award may be made per Phase II project

Invitation needed →

Phase IIA: For certain prototype, product, or process that need more than a single Phase II award. start immediately upon completion of the Phase II.

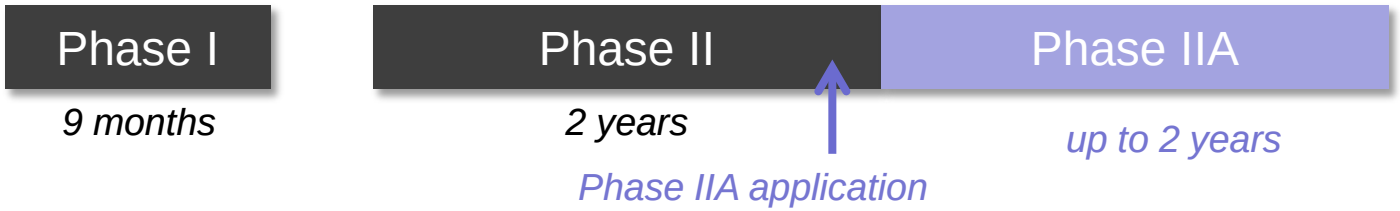
- *DOE Program Managers will select the topics/subtopics for which Phase IIA applications will be accepted (By subtopic invitation only)*

No Invitation needed →

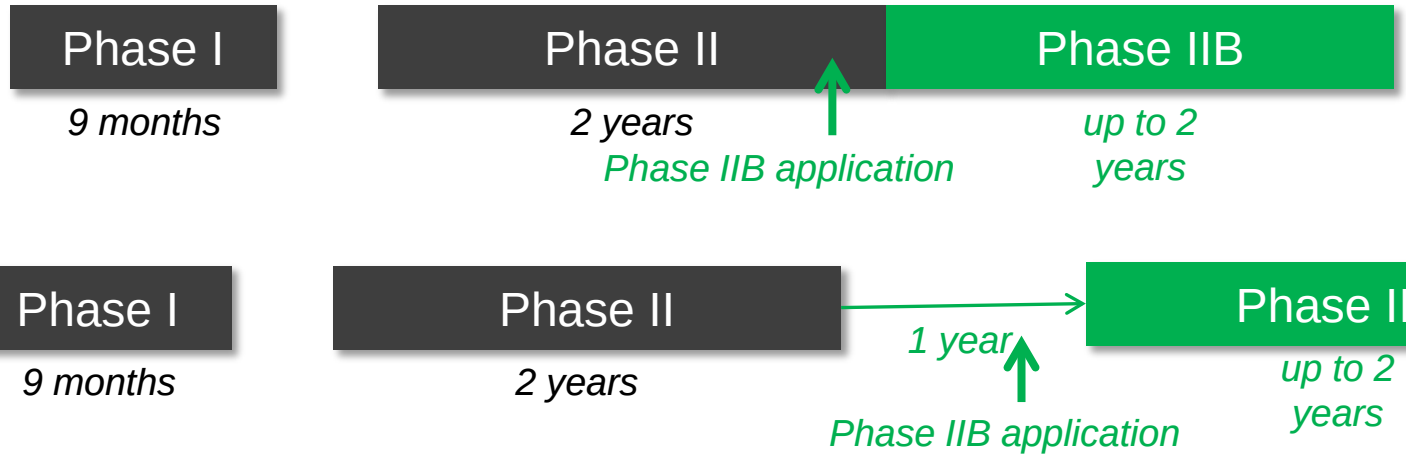
Phase IIB: For R&D funding required to transition an innovation towards commercialization. start immediately after completing a Phase II or up to 1 year later.

In each of FY 2014 and FY 2015 Phase II cycle: NP received 3 Phase IIB applications, peer reviewed all and none were funded. Compete with new Phase II applications.

Sequential Phase IIA



Sequential Phase IIB



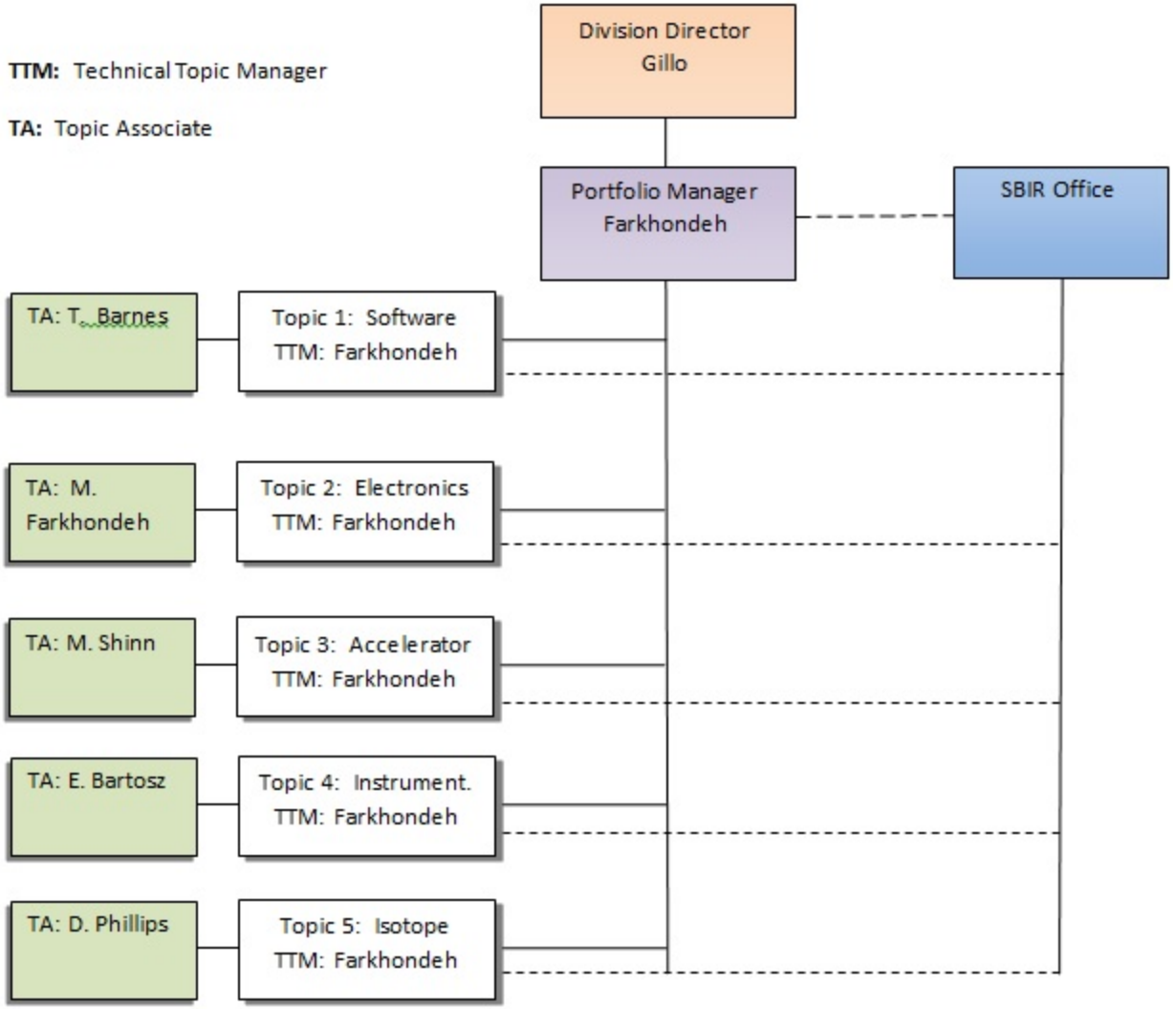
Slide: Courtesy of Dr. Manny Oliver

No Fund Extensions and Sequential Phase II Eligibility

- A company can only receive a Sequential Phase II award if their Phase II project has completed.
  - Phase IIA applicants should not request no fund extensions
  - Phase IIB applicants should not request no fund extensions if they are still working on their Phase II project at the time of application.

Slide: Courtesy of Dr. Manny Oliver

NP SBIR/STTR Org Chart



More Notes: DOE SBIR/STTR Program changes in FY12 -16

- DOE **Publishing Phase I solicitation twice a year**
  - **Release 1**: Office of Science call for proposal August-September (FY15: w/o HEP)
  - **Release 2:** Rest of DOE call for proposal December-January (FY15: and HEP)

- **Speeding up of processing of applications:**
  - Early posting of topics
  - Letter of intent required (for process of identifying reviewers)

LOI: List all potential Collaborations / subcontracts /Consultants

- **Increased emphasis on commercialization**
  - declination of phase I application lacking a commercialization plan
  - Phase II applications with poorly rated commercialization plans, independent of their technical merit review scores, may not be eligible for funding

- **Fast Track Proposals:**
  - Programs now can elect to accept Fast Track Proposals for any topics. Fast Track is a combined Phase I and Phase II with a nominal maximum funding of $1,150k

Notes on “Final Reports”

➢ When preparing the “Final Report” for your grant, make sure the following items are included in addition to what the instruction explicitly asks for.

a. **List the original tasks** with brief description of each as they were originally proposed in the grant application.

b. **A short description of accomplishments** for each task indicating the degree to which each task was accomplished. Include a short description if a listed task was not accomplished or was modified.

c. Add to the cover page the phrase "**Grant supported by DOE office of Nuclear Physics”.**

➢ These items should add only few pages to the report but provide a valuable reference and structure in the report by connecting the original tasks to the accomplishments.

➢ Reports are normally returned for revisions if above items not included.

Presentation Notes

- We have a tight agenda and must stay on time for each presentation.
- Sessions will start sharply at the time stated on the agenda. Please take your seat a few minutes before the start of each session to allow the first presentation to begin on time.
- Make sure your presentation file is uploaded on the display laptop before the start of your session.
- For Q&A sessions, please make your comments /questions short and use the coffee breaks and lunch breaks for follow ups.

Total presentation (min)	Presentation (min)	Q&A (min)	5 and 2 minutes warning @ (min)
35	25	10	20 & 23
30	20	10	15 &18
25	18	7	13 & 16

Back up Slides

Transition Rate Metrics

- Phase II → Phase III success rate
  - Applies to companies that have received > 15 Phase II awards during the last 10 fiscal years, excluding the two most recently completed fiscal years
  - Metric calculation example for FY 2012

$$\frac{Total\ Investment + Revenue\ from\ Phase\ II\ Awards\ FY\ 2000-2009}{Number\ of\ Phase\ II\ Awards\ FY\ 2000-2009} \geq \$100{,}000$$

OR

$$\frac{Number\ of\ Patents\ from\ Phase\ II\ Awards\ FY\ 2000-2009}{Number\ of\ Phase\ II\ Awards\ FY\ 2000-2009} \geq 0.15$$

Transition Rate Metrics

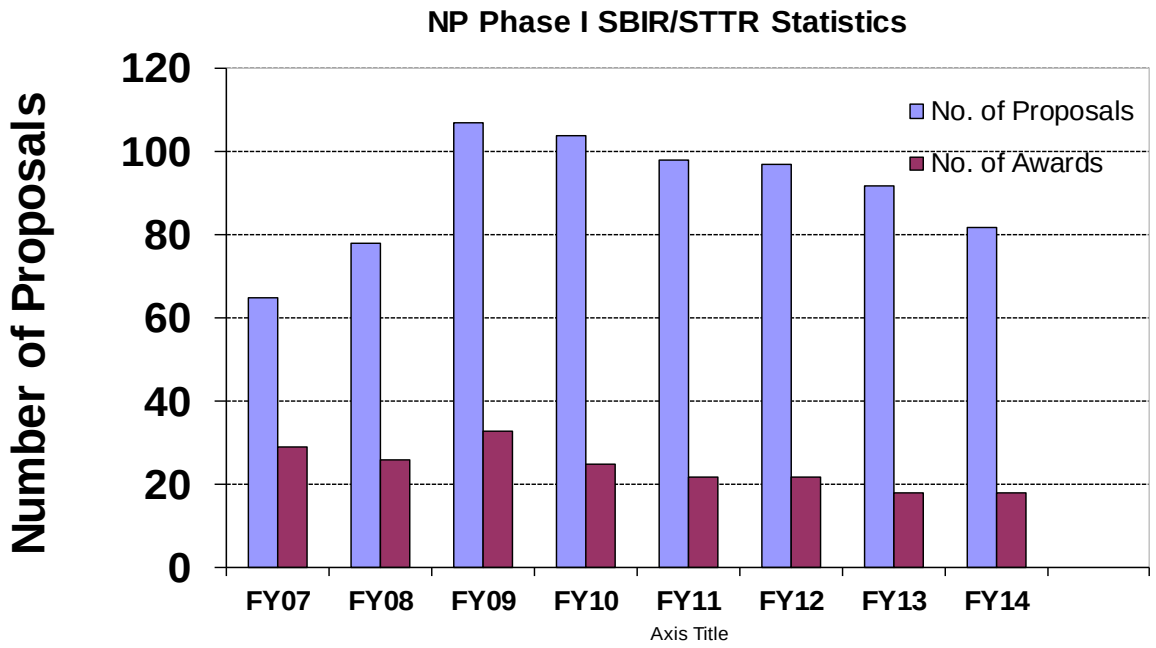
- Companies that fail to meet the either metric will be ineligible to apply for any Phase I awards for 1 year.
- Companies can see if they fail to meet either metric by checking the SBA company registry (SBIR.gov)
- Implementation
  - Phase I → II Transition Rate metric will be included in the FY 2014 and future Phase I Funding Opportunity Announcements
  - Phase II → III Transition Rate metric will be included in the FY 2015 and future Phase I Funding Opportunity Announcements

Back up Slides

Back up Slides

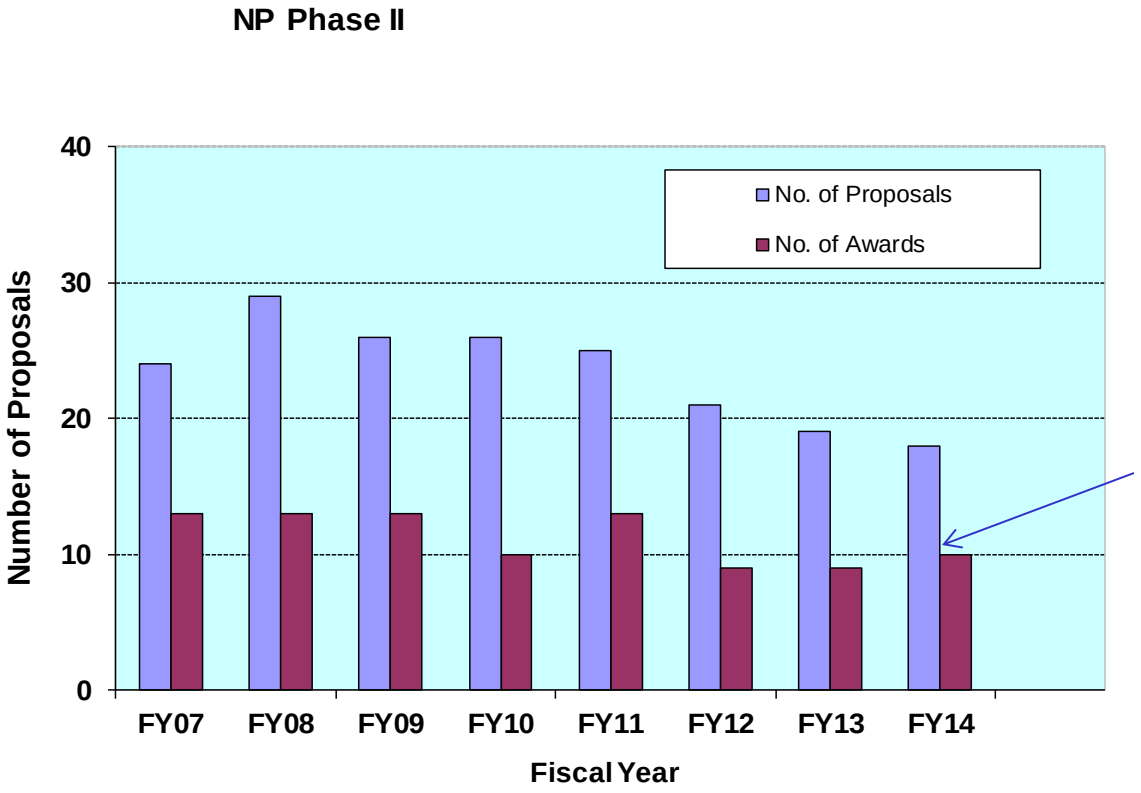
NP Phase I SBIR/STTR Applications and Awards

- NP received a Total of **88** phase I proposals in FY 2014, with over 350 reviews.
- Increases of max SBIR award amounts in FY 2011 are to provide adequate funding of grants. These increases will also result in a reduction in number of Phase I grants that can be funded each year.



NP Phase II SBIR/STTR Applications and Awards

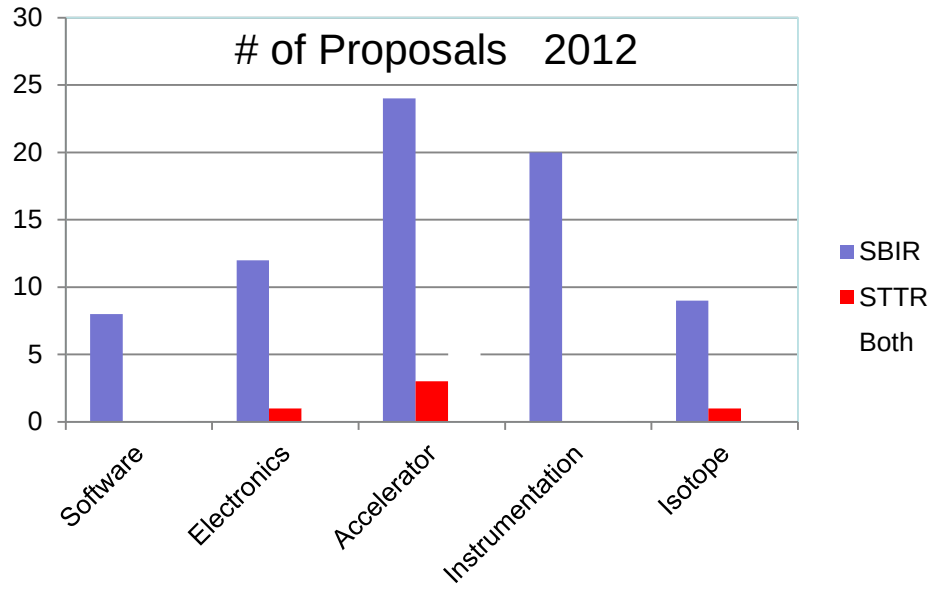
The increases in maximum SBIR award amounts started in FY 2011 has affected number of phase II awards that can be supported.



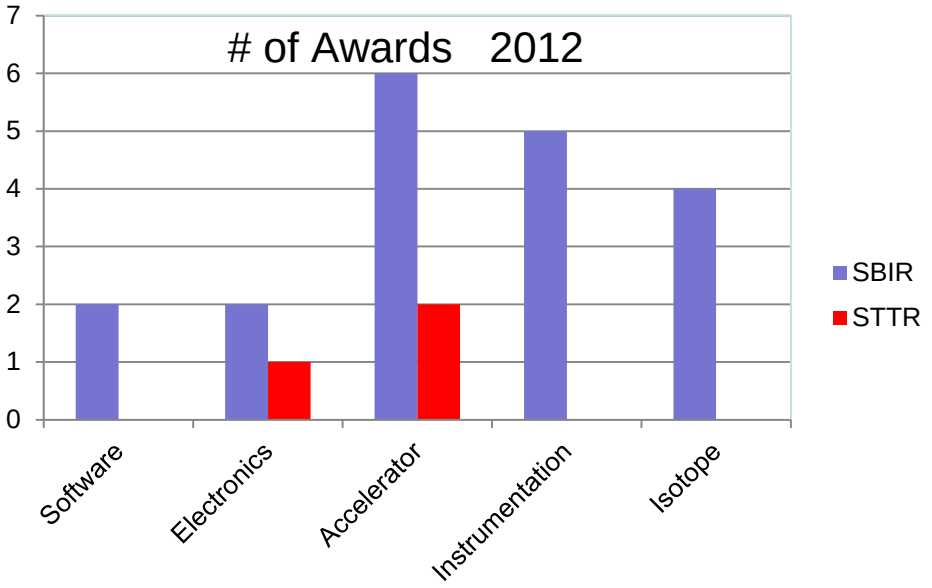
NP SBIR/STTR Statistics 2012

2012 Proposals

Phase I



2012 Awards



More Notes: DOE SBIR/STTR Program changes for FY 2014

- **Implementation of Office of Science PAMS system**

Portfolio Analysis and Management System (PAMS):

- Office of Science began using PAMS to receive Grants.gov proposals in October 2011.
- The external PAMS site was launched in May 2012.
  https://pamspublic.science.energy.gov/
- The review functionality was launched March 2013.
- All mail and panel reviews for FY14 Phase I cycles were done through PAMS.

More Notes: DOE SBIR/STTR Program changes in FY12 -15

Motivation: Started to implement reauthorization bill, improve commercialization rate, and improve administration of the programs.

- **Publishing Phase I solicitation twice a year**
  - **Release 1**: Office of Science call for proposal August-September (FY15: w/o HEP)
  - **Release 2:** Rest of DOE call for proposal December-January (FY15: and HEP)

- **Speeding up of processing of applications:**
  - Early posting of topics
  - Letter of intent required (for process of identifying reviewers)

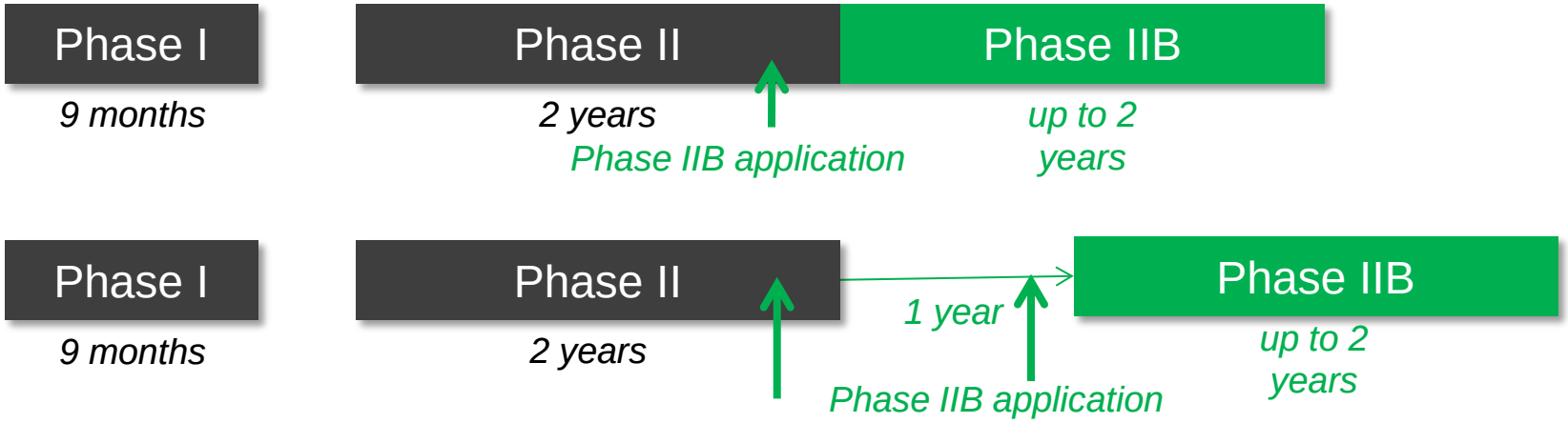
LOI: List all potential Collaborations / subcontracts /Consultants

- **Increased emphasis on commercialization**
  - declination of phase I application lacking a commercialization plan
  - Phase II applications with poorly rated commercialization plans, independent of their technical merit review scores, may not be eligible for funding

- **Fast Track Proposals:**
  - Programs now can elect to accept Fast Track Proposals for any topics. Fast Track is a combined Phase I and Phase II with a nominal maximum funding of $1,150k

Sequential Phase IIB

- DOE is utilizing Phase IIB to increase the number of positive commercialization outcomes resulting from Phase II awards
- Phase IIB awards will start immediately after completing a Phase II or up to 1 year later



Slide: Courtesy of Dr. Manny Oliver