U.S. DEPARTMENT OF ENERGY | Office of Science

FY2015 HEP University Comparative Review Statistics and Lessons Learned

High Energy Physics Advisory Panel (HEPAP)
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FY15 COMPARATIVE REVIEW PROCESS AND STATISTICS

FY15 Submitted Proposals

- For the FY 2015 cycle, 153 proposals requesting support totaling $221.88M in one or more of the 6 HEP subprograms were received by the September 23, 2014 deadline in response to the Funding Opportunity Announcement (FOA) *"FY 2015 Research Opportunities in High Energy Physics"* [DE-FOA-0001140].
- 7 proposals were subsequently withdrawn by the respective sponsoring institutions
  - 5 were duplicate submissions + 2 were withdrawn at request of the PIs
  - led to 146 proposals into the pre-screening stage for proposal's responsiveness to the subprogram descriptions and for compliance with the FOA requirements
- After pre-screening, 7 were declined before the competition:
  - 3 proposals declined without review for reasons of exceeding page limits
    - hard page limits and other requirements for application are given in FOA; Proposals not respecting the page limits or other requirements were NOT reviewed.
  - 2 proposals were non-compliant with other FOA requirements
    - 1 proposal requested support across 2 research thrusts but did not separate budgets by thrusts
    - 1 proposal requested support of named Research Scientists but did not include the required biographical sketch for the Research Scientists
  - 2 were outside the scope of DOE/HEP supported research
- PIs with proposals that were rejected for "technical" reasons could re-submit to general DOE/SC solicitation [DE-FOA-0001204]

FY15 Reviewers & Panels

- For the FY15 HEP Comparative Review process, 139 proposals were reviewed, evaluated and discussed by several panels of experts who met in the:

Research Subprogram	Panel Deliberations	# of Total Proposals Reviewed [includes proposals containing multiple subprograms]
HEP Theory	November 17-19, 2014	43
Accelerator Science and Technology R&D	November 17-18, 2014	33
Cosmic Frontier	November 19-21, 2014	27
Energy Frontier	December 3-4, 2014	25
Intensity Frontier	December 4-5, 2014	30
Detector R&D	December 4-5, 2014	21

- 19 of the proposals requested research support from two or more of the six sub-programs, *e.g.* "umbrella" proposals, in which case the proposal was sent in its entirety to all relevant panels.
  - However, the panels were asked to explicitly compare and rank only the section(s) of the proposal relevant to the subprogram they were reviewing.
- Each proposal which satisfied the requirements of the solicitation was sent out for review by at least three experts.
  - 153 reviewers participated in the review process. In cases where there were proposals on similar topics, reviewers were sent multiple proposals.
  - 687 reviews were completed with an average 4.9 reviews per proposal

FY15 Review Data — by Proposal

	HEP Subprogram						HEP Total
	Energy	Intensity	Cosmic	Theory	Acc. R&D	Det. R&D	
Received	27	30	27	43	35	24	146
Declined Without Review	2	0	0	0	2	3	7
Reviewed	25 (6)	30 (9)	27 (17)	43 (17)	33 (20)	21 (11)	139 (79)
Funded	19 (3)	19 (3)	12 (5)	27 (3)	7 (1)	9 (2)	63[(a)] (16)
Declined	6 (3)	11 (6)	13 (10)	16 (14)	24 (19)	12 (9)	72 (61)
"Success Rate" (%) (Previous/New)	76	63	44	63	21	43	45 (78/20)

NOTES:

- **Single proposals with multiple research thrusts are counted multiple times [1 /thrust]**
- ( ) indicates number of proposals from research PI/groups that did not receive DOE HEP funding in FY14.
- "Success Rate" is = # Funded/ # Reviewed.
- Most proposals are not fully funded at their "requested" level.
- About 43% of the proposals reviewed were from research groups that received DOE HEP funding in FY14.
- Overall success rate of reviewed proposals in FY15 for previously (newly) funded groups was 78% (20%).
- 63 total grant awards funded in FY15 at $32.95M [= 24.48M 'renewal' + 8.47M 'new' proposals]

[(a)] Total does not include 4 [= 2 Cosmic + 2 Accelerator] proposals currently 'on-hold' and pending funding decisions (*e.g.*, funding relative to separate federal agencies, FY15 funding availability).

FY15 Declined Proposals

- **Based on the reviewers' assessments, the comparison and ranking of the proposals by the panel(s) within the subprogram(s), evaluations of the needs of the HEP research program by the respective program managers, the potential impact of the proposed work, the proposals' responsiveness to the FY15 HEP Comparative Review FOA:**
  - **72 proposals were recommended for declination**
  - **declinations primarily due to**
    - **proposals and/or senior investigators received poor merit reviews and/or reviewers noted that the proposed research would not have high impact when compared to others in the same subprogram**
    - **proposals were seeking support for research currently not within the DOE/HEP program and/or were not aligned with the 2014 P5 recommendations and priorities**
    - **budgetary constraints**

FY15 Review Data — by Senior Investigator

	HEP Subprogram						HEP Total
	Energy	Intensity	Cosmic	Theory	Acc. R&D	Det. R&D	
Received	58	59	43	87	49	53	326
Declined Without Review	6	0	0	0	3	7	13
Reviewed	52 (9)	59 (19)	43 (28)	87 (25)	46 (29)	46 (23)	313 (128)
Funded	42 (4)	40 (7)	19 (9)	55 (3)	10 (1)	18 (2)	174[(a)] (24)
Declined	10 (5)	19 (12)	21 (16)	32 (22)	33 (25)	28 (21)	133 (98)
"Success Rate" (%) (Previous/New)	81	68	44	63	22	39	56 (81/19)

NOTES:

- ( ) indicates number of senior investigators that did not receive DOE HEP funding in FY14.
- "Success Rate" is = # Funded/ # Reviewed.
- Overall success rate in FY15 for previously (newly) funded DOE HEP PIs was 81% (19%).

[(a)] Total does not include 6 [= 3 Cosmic + 3 Accelerator] PIs currently 'on-hold' and pending funding decisions (*e.g.*, funding relative to separate federal agencies, FY15 funding availability).

FY15 Review Data

Jr. Faculty and Research Scientists (RS)

	Junior Faculty		Research Scientists	
	Total # Jr. Faculty Reviewed (New)	# Jr. Faculty Funded (New)	Total # Res. Scientists Reviewed (New)	# Res. Scientists Funded (New)
Energy Frontier	10 (5)	8 (4)	13 (3)	8[(a)] (1)
Intensity Frontier	8 (5)	6 (3)	6 (2)	3 (0)
Cosmic Frontier	12[(b)] (12)	5 (5)	4 (1)	3 (1)
HEP Theory	5 (5)	3 (3)	0 (0)	0 (0)
Accelerator R&D	3[(b)] (3)	0 (0)	37[(c)] (23)	7 (0)
Detector R&D	2 (1)	1 (0)	5 (2)	2 (0)
HEP Total:	37 (28)	21 (13)	63 (31)	23 (2)

NOTES:

(a) DOE worked with US-CMS or US-ATLAS management and the university PIs to provide guidance on the scope and FTE levels related to Research Scientists prior to PI's submission of application to the FOA. (Of the 5 RS not funded, US-LHC Operations program is working with DOE on priorities & support)

(b) Does not include PIs that are 'on-hold' pending funding decisions from separate funding agencies and/or funding availability.

(c) Includes multiple proposals each with different research scope submitted by certain institutions, which contained multiple corresponding requests for support of the same RS.

FY15 Proposals *vs.* FY14 Status

	New Proposals		Efforts funded in FY14				Total
	Fund	Decline	Up	Flat	Down	No-Fund	
Energy Frontier	3	3	5	4	7	3	25
Intensity Frontier	3	6	8	2	6	5	30
Cosmic Frontier	5	10	2	1	4	3	27[(a)]
HEP Theory	3	14	4	9	11	2	43
Accelerator R&D	1	19	1	3	2	5	33[(a)]
Detector R&D	2	9	3	2	2	3	21

DEFINITIONS:

- New/Fund = HEP research effort was not funded at this institution in FY14 but is funded in FY15.
- New/Decline = HEP research effort was not funded at this institution in FY14 and is not funded in FY15.

- **Up = FY15 funding level +2% or more compared to FY14.**
- **Flat = FY15 funding level within ±2% of FY14.**
- **Down = FY15 funding -2% or more compared to FY14.**
- **No-Fund = No funding is provided in FY15. This effort was funded in FY14.**

(a) Total does not include 4 [= 2 Cosmic + 2 Accelerator] proposals currently 'on-hold' and pending funding decisions (*e.g.*, funding relative to separate federal agencies, FY15 funding availability).

Full Funding of Multi-Year Grants

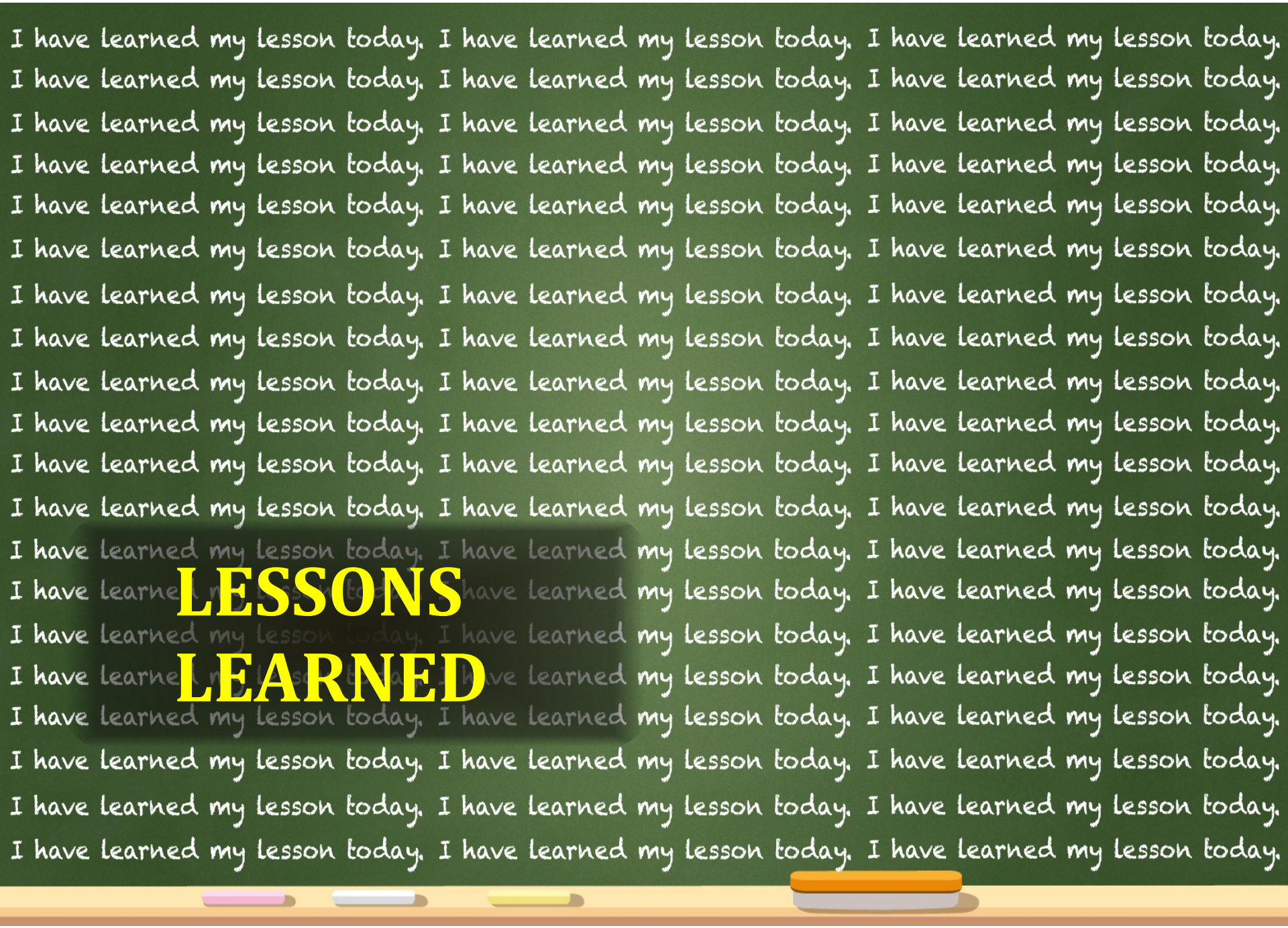
- **On January 17, 2014, the President signed the 2014 Consolidated Appropriations Act (CAA): Section 310(D) requires full funding of multi-year grants and/or cooperative agreements received from academic institutions with total cost less than $1M.**
  - **"Full funding" implies funds for the *entire award* for the proposal's project period is obligated at the time the award is made, instead of funding year-by-year.**
  - **Requirement continues into FY 2015 as a result of legislation passed on December 13, 2014.**
- **Logistics on full funding:**
  - **Process applies to new, renewal, or supplemental grant awards that are made after the merit review process.**
  - **No other exemptions from this provision apply other than grants and cooperative agreements are of total cost less than $1M – integrated over the project period approved for the proposal.**
- **During the submission of a proposal along with conducting its merit review and making decisions on the award:**
  - **There will be no change to how an applicant applies for a grant or cooperative agreement.**
  - **There will be no change to the merit review process.**
  - **There will be no change to DOE Program Managers requesting revised budgets from PIs.**
- **DOE Program Managers (PM) continue to have oversight of the research program by requiring PIs to submit an annual research performance progress report that must be approved by the PM prior to any funds being accessed by the PI the following year.**

FY15 Review Data — Full Forward Funding

Research Subprogram	# Proposals Reviewed	# Proposals Funded	# Multi-Year Grant Awards Fully Forward Funded (Period > 1 year)	$k TOTAL: FY15 (1st year of project period)	$k TOTAL: FY15 (over *entire* multi-year project period for Fully Forward Funded grants)
Energy Frontier	25	19	0	0	0
Intensity Frontier	30	19	0	0	0
Cosmic Frontier	27	12	3	290	730
HEP Theory	43	27	13	1,750	3,500
Accelerator R&D	33	7	5	685	2,055
Detector R&D	21	9	7	756	1,427
HEP Total:	139	63	28	3,481	7,712

NOTES:

- **# Multi-Year Grant Awards Fully Forward Funded** = total number of funded proposals that received a HEP comparative review grant where Section 310(D) of 2014 Consolidated Appropriations Act (CAA) and legislation thereafter applies. *The approved project period for a grant is greater than 1 year*.
- **$k TOTAL: FY15 (1st year of project period)** = funds applied only towards the 1st year of the project period. Reflects the total amount allocated for up to 12-months of Fiscal Year 2015 for these multi-year grant awards.
- **$k TOTAL: FY15 (over entire multi-year project period for Fully Forward Funded grants)** = total amount provided from the FY15 HEP budget for fully forward funded grants for the entire duration of the multi-year project period.
- **Section 310(D) of 2014 CAA and legislation thereafter applied to ~44% of the proposals funded in the FY15 HEP Comparative Review process.**
- **Difference between the last two columns provides a measure of the "effect" of FY15 fully forward funded HEP comparative review grants = $4.23 M total; does not include "trivial" case of ten 1-year awards totaling $1.21M.**
- ***For Ref:*** **Out of 139 proposals reviewed, total # of incoming multi-year proposals with *budget requests* over a project period < 1M$ was 85 proposals (~61% of proposals reviewed).**


I have learned my lesson today.
LESSONS
LEARNED

Lessons Learned (I)

- **Proposal submission, reviewer proposal assignments, input for reviews, and awarding grants – all managed through DOE's Portfolio Analysis and Management System (PAMS)**
  - **Use of PAMS framework for the review process is in its 2nd year for DOE/HEP reviews**
  - **DOE/HEP continues to exercise system for de-bugging and longer-term improvements**

- **Prior to a panel's deliberation, DOE/HEP re-evaluating method and schedule to obtain [mail-in] reviewer's written comments and evaluations in PAMS — in a timely manner — in order to process and assemble all the reviews to discuss at a subprogram's panel**

- **For continual improvement of process, we implemented past lessons learned – *for e.g.,***
  - **Organized PI Meetings in June 2014 at Rockville Hilton to provided guidance to PIs on programmatic & P5 priorities, preparing a better proposal narrative, and uniformly summarizing personnel distribution and budgets for umbrella proposals**
    - **DOE/HEP planning with APS DPF organizers to hold "mini" PI meeting & sessions with DOE Program Managers at the DPF August 4-8, 2015 meeting at U. Michigan, Ann Arbor**
    - **Plan for another "larger" HEP PI meeting in summer 2016 in the Washington, DC area**
  - **Strongly encourage panelists to write any additional comments made during the panel deliberations into PAMS prior to adjourning**

Lessons Learned (II)

- **During past fiscal years, most HEP funded grants were aligned to begin their project period on April 1**
  - Start date was selected based on a Continuing Resolution lasting (on average) 3–6 months after Oct. 1
  - April 1 allowed DOE/HEP to effectively plan university-awarded grant actions based on an actual Congressional Appropriation

Grant Award (Continuations, Comp Review) Start Dates	# of DOE/HEP Grant Actions [Does not include SciDAC, Acc. Stewardship, Early Career, SBIR/STTR]
April 1 – April 15	199
May 1 – May 15	13
June 1	5
TOTAL	217

- **Given available staff and resources at DOE/HEP, various challenges in the office are created while simultaneously processing grants and completing other required tasks in January–March of each year**
  - *For e.g.,* budget and strategic planning, project and operations reviews, institutional reviews, etc…

- **DOE/HEP is considering moving the start date for a fraction of total grant actions to May 1**
  - Certain new awards (not previously funded by DOE) were already moved as a result of the FY15 comparative review actions
  - Office is conducting an analysis study to understand impacts on budgets if other grants can also begin with a later project start date from April 1

Closing Remarks

- With the FY15 FOA, DOE/HEP completed the 4th round of the annual university comparative review process
- With respect to the FY14 Comparative Review
  - FY15 had larger number of total proposals and PIs
    - 139 proposals (FY15) *vs.* 124 proposals (FY14)
    - 313 senior investigators (FY15) *vs.* 277 senior investigators (FY14)
    - Increase due to combination of factors: historic renewal pattern + proposals resulting from P5-rollout + applicants reapplying from declinations in FY14
  - Within ±5%, overall average proposal success rate slightly lower
    - effort made to fund PIs and groups that review with high merit & high impact and those aligned with DOE's program, mission, and P5 priorities
  - Success rate for Sr. Research Scientists varied between each subprogram
    - in FY15, success rate was slightly lower in Energy Frontier Research due to merit reviews
- FY15 HEP research budgets continued to be under pressure
  - Impacts to both university and laboratory funding; Frontiers, Accelerator & Detector R&D, Theory
  - Execution of Fully Forward Funded awards affected primarily the HEP Theory and Accelerator R&D programs
  - As a result of P5 guidance, DOE/HEP anticipates FY15 as the final year for reductions in overall research while current plans for FY16 research are at ~flat levels with respect to FY15
- For FY16 review, DOE/HEP organizing PI meeting sessions at Aug. DPF Meeting at U. Michigan

REFERENCE SLIDES

Comparative Merit Review Criteria

1) **Scientific and/or Technical Merit of the Project**
   For e.g., What is the scientific innovation of proposed effort? What is the likelihood of achieving valuable results? How might the results of the proposed research impact the direction, progress, and thinking in relevant scientific fields of research? How does the proposed research compare with other research in its field, both in terms of scientific and/or technical merit and originality? ***Please comment individually on each senior investigator.***

2) **Appropriateness of the Proposed Method or Approach**
   For e.g., how logical and feasible is the research approach of each senior investigator? Does the proposed research employ innovative concepts or methods? Are the conceptual framework, methods, and analyses well justified, adequately developed, and likely to lead to scientifically valid conclusions? Does the applicant recognize significant potential problems and consider alternative strategies?

3) **Competency of Research Team and Adequacy of Available Resources**
   For e.g., what are the past performance and potential of each senior investigator? How well qualified is the research team to carry out the proposed research? Are the research environment and facilities adequate for performing the research? Are PIs or any members of the group leaders on proposed effort(s) and/or potential future leaders in the field? Does the proposed work take advantage of unique facilities and capabilities? For PIs proposing work across multiple research thrusts, are the plans for such cross-cutting efforts reasonably developed and will the proposed activities have impact?

4) **Reasonableness and Appropriateness of the Proposed Budget**
   Are the proposed resources and staffing levels adequate to carry out the proposed research? Are all travel, student costs, and other ancillary expenses adequately estimated and justified? Is the budget reasonable and appropriate for the scope?

5) **Relevance to the mission of the DOE Office of High Energy Physics (HEP) program**
   For e.g., How does the proposed research of each senior investigator contribute to the mission, science goals and programmatic priorities of the subprogram in which the application is being evaluated? Is it consistent with HEP's overall mission and priorities? For PIs proposing to work and/or transition across multiple research thrusts during the project period, will their overall efforts add value in the context of HEP program goals & mission? How likely is the research to impact the mission or direction of the overall HEP program?

6) **Accomplishment and Plans of Senior Investigator(s)**
   What is the scientific merit and potential impact of the senior investigator's proposed work? What is the competency of senior investigator's team and likelihood of success? Compare the senior investigators to others working in same research area.

7) **General Comments and Overall Impression**
   Include any comments you may wish to make on the overall strengths and weaknesses of the proposal, especially as compared to other research efforts in this area. If there are significant or unique elements of the overall proposal, including institutional setting and resources, synergies with other relevant subprograms, or other broader considerations not noted above.

HEP General Accelerator R&D (GARD)

- FY15 Accelerator R&D reviewers included 46 experts (33 mail-in reviewers + 13 panelists) from a broad and comprehensive area of the particle physics accelerator-based community:
  - SRF technology, superconducting magnets and materials, normal conducting high gradient structures, accelerator and beam physics, particle sources and beam targetry
  - Selection of reviewers was based on an initial review of the research scope described in the batch of proposals that were submitted in response to the FOA
- Review process
  - Each proposal was reviewed by at least four experts in the field (mail-in and panelists)
  - All proposals were discussed by the panel, and those that ranked in the highest 70% tier, a subsequent decision was made by the PM for further discussion in the panel
- Award selection
  - Only proposals with the highest scientific merits and potential future impact were funded
  - Grant size was determined by the research scope and in some cases had to be adjusted to fit the available funding
- Limited budget available for the HEP General Accelerator R&D program and the need to fully forward fund awards under $1M resulted in very low success rate. Many proposals receiving good reviews from individual panelists were not able to be funded.
- The HEPAP Accelerator Subpanel recognizes the serious budget constraints in GARD

HEP Theory

- FY15 HEP Theory comparative review panel was composed of 13 experts from all areas of theoretical particle physics
  - phenomenology, particle astrophysics/cosmology, lattice gauge theory, formal/mathematical theory, etc..
  - Selection of reviewers was based after an initial review of the research scope described in the batch of proposals that were submitted in response to the FOA
- In total, the panel considered 43 proposals covering the work of 87 Senior Investigators
  - Each proposal was initially evaluated by a subset of panelists and additional selected mail-in reviewers
  - During the subsequent panel meeting held in November 2014, each PI was individually evaluated and ranked among one of five tiers according to their relative merit and impact
- Only those PI's in the top three tiers were funded, at levels corresponding to the tier
  - For group grants, the total grant size was determined by the sum of the individual contributions
  - Funding levels are therefore based on current merit and impact, regardless of the funding history of the individual investigators or their home institutions
- Further, due to the limited budget available for the HEP Theory program and the need to perform comparative assessments, several proposals/PI's were not able to be funded even though they may have received good individual reviews

FY12–15 Review Data — Proposals & PIs

	HEP Total – by Proposals (across all 6 Subprograms)			
	FY12 Review	FY13 Review	FY14 Review	FY15 Review
Received	136	185	129	146
Declined Without Review	14	23	5	7
Reviewed	122	162 (58)	124 (71)	139 (79)
Funded	85	101 (20)	62 (17)	63 (16)
"Success Rate" (%) (Previous/New)	70 (—)	62 (78/34)	50 (85/24)	45 (78/20)

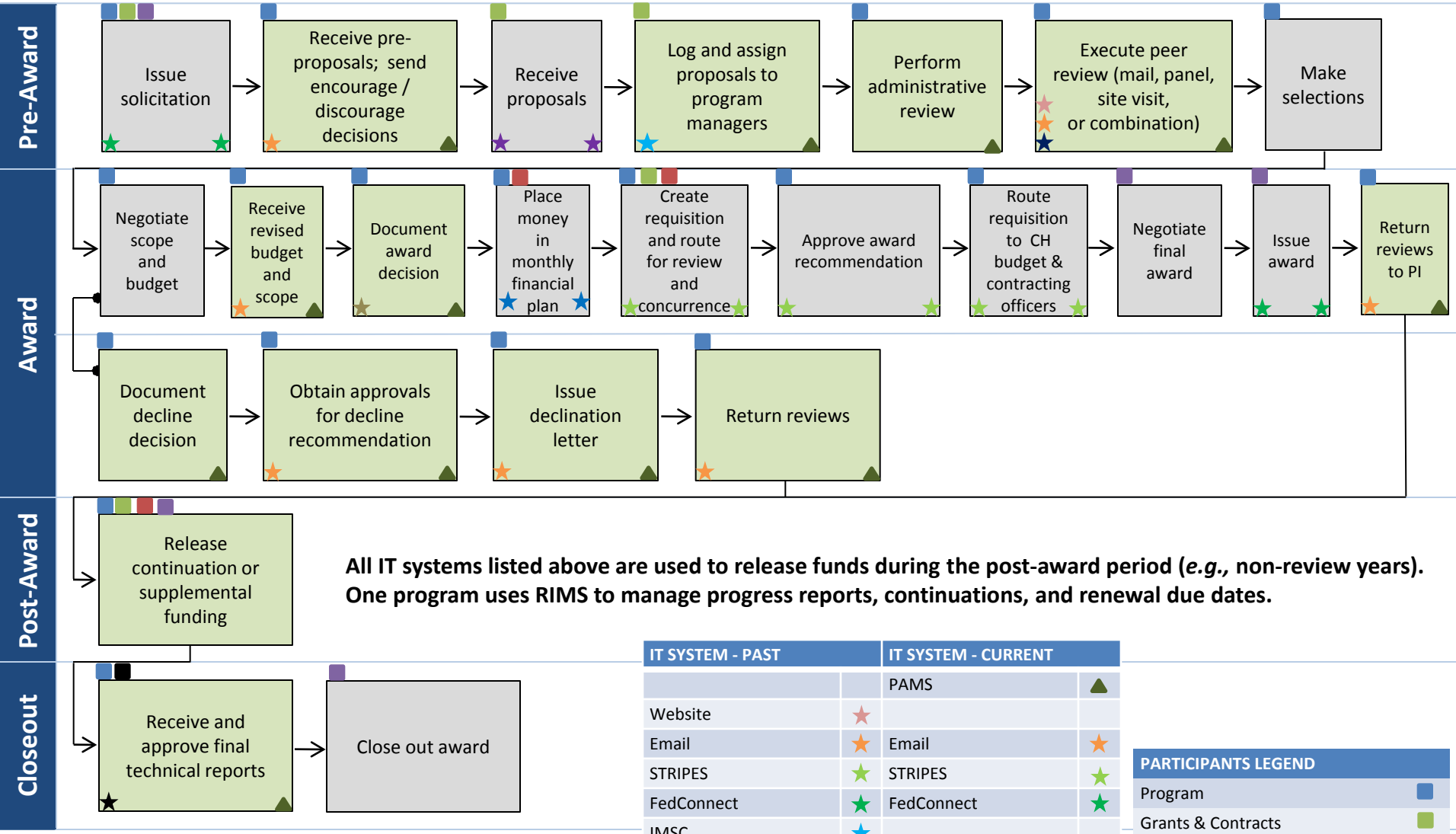
	HEP Total – by Senior Investigators (across all 6 Subprograms)			
	FY12 Review	FY13 Review	FY14 Review	FY15 Review
Received	253	504	285	326
Declined Without Review	21	42	8	13
Reviewed	232	462 (113)	277 (97)	313 (128)
Funded	162	338 (40)	178 (31)	174 (24)
"Success Rate" (%) (Previous/New)	70 (—)	73 (85/35)	64 (82/32)	56 (81/19)

NOTES:

- ( ) indicates number of proposals or PIs that did not receive DOE HEP funding the previous fiscal year.
- "Success Rate" is = # Funded/ # Reviewed.

Universities (Financial Assistance)

PAMS Contributions



All IT systems listed above are used to release funds during the post-award period (*e.g.,* non-review years). One program uses RIMS to manage progress reports, continuations, and renewal due dates.

IT SYSTEM - PAST		IT SYSTEM - CURRENT	
		PAMS	▲
Website	★		
Email	★	Email	★
STRIPES	★	STRIPES	★
FedConnect	★	FedConnect	★
IMSC	★		
FMIS/FDS	★	FMIS/FDS	★
PeerNet	★		
Grants.gov	★	Grants.gov	★
Selection Statement Software	★		
E-Link	★		

PARTICIPANTS LEGEND	
Program	
Grants & Contracts	
Budget	
Chicago	
OSTI	

Crosscutting Activities During Above:

- Document decisions manually in IMSC
- Send correspondence by paper or email or RIMS

PAMS = Portfolio Analysis and Management System

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Proposal Tiers: Merit vs. Funding (Example Matrix)

- **During a subpanel's closeout, after reviewing *all* proposals and *all* senior investigators, panels deliberated by**
  - **Categorizing each proposal in 2-dimensional Tiers based on: Merit Review *vs.* Funding Request**
  - **Treat the reasonableness of funding requests independent from the science merits**

CLOSEOUT: PROPOSAL TIERS	Merit Tier 1 (Outstanding)	Merit Tier 2 (Above Average)	Merit Tier 3 (Average)	Merit Tier 4 (Below Average)	Merit Tier 5 (Poor)
Funding Tier 1 (require minimum budget adjustment)	University A	University D	University H		
Funding Tier 2 (require average budget adjustment)	University B University C	University E University F	University I University J University K University L	University O	
Funding Tier 3 (require maximum budget adjustment)		University G	University M University N		University Q *(e.g., term soft-landing)*
Tier 4: No Fund				University P	University R University S

- **Panelists were asked to consider the level of support needed to accomplish research goals of each application**
  - **Make "comparisons": are the *budget requests* submitted by the PIs reasonable, appropriate, and justified for carrying out the research when compared to other applications with similar scope?**
  - **No consensus was taken and members of panel encouraged to voice individual opinions (and noted)**
    - **the above matrix served as a 1st order guide when DOE PMs later made funding decisions**