



U.S. DEPARTMENT OF  
**ENERGY**

Office of  
Science

# **FY2016 HEP University Comparative Review Statistics and Lessons Learned**

**High Energy Physics Advisory Panel (HEPAP)  
DoubleTree Bethesda • Bethesda, Maryland  
March 31-April 1, 2016**

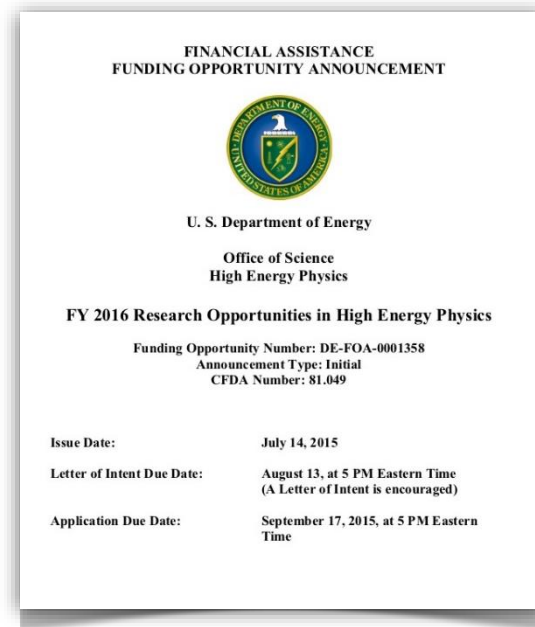
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The image features several stacks of copper coins, likely pennies, arranged in a cluster. The stacks vary in height, with some being taller than others. The coins are stacked on a light-colored surface, and the background is a plain, light color. The lighting is bright, highlighting the metallic texture of the coins.

# **FY16 COMPARATIVE REVIEW PROCESS AND STATISTICS**

# FY16 Proposal Submission

- Funding Opportunity Announcement (FOA), “FY 2016 Research Opportunities in High Energy Physics” [DE-FOA-0001358], for the FY 2016 university comparative review process was issued **July 14, 2015**
  - Marked the 5<sup>th</sup> round of annual university comparative review process in HEP
- **6 HEP research subprograms:**
  - Energy, Intensity, and Cosmic Frontiers
  - HEP Theory
  - Accelerator Science and Technology R&D
  - Detector R&D
- **Letter of Intent (strongly encouraged) due August 13, 2015**
- **Final Proposal deadline September 17, 2015**
- In addition to information provided in the FOA, a FAQ was provided on the DOE/HEP Funding Opportunity website with answers and guide that addressed key topics relevant to the HEP comparative review process
- For the FY 2016 cycle, **163 proposals** requesting support totaling **\$254.91M** in one or more of the 6 HEP subprograms were received by the September 17<sup>th</sup> deadline in response to the FOA



# FY16 Proposals: Initial Review Criteria

- 7 out of 163 proposals were subsequently withdrawn by the respective sponsoring institutions
  - 5 were duplicate submissions + 2 were withdrawn at request of the PIs
  - led to **156 proposals** into the pre-screening stage for proposal's responsiveness to the subprogram descriptions and for compliance with the FOA requirements
- After pre-screening, 22 'complete' proposals were declined before the competition:
  - 5 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.**
  - 6 proposals did not contain a Data Management Plan (DMP) on the management of digital data for applications requesting support for research
    - **SC-wide requirement for research-based solicitations issued on or after October 1, 2014**
  - 7 proposals were non-compliant with other FOA requirements
    - **3 proposals requested support across  $\geq 2$  research thrusts but did not separate budgets by thrusts**
    - **4 proposals included Personally Identifiable Information (PII) in PI's biographical sketch (CV)**
  - 1 was outside the scope of DOE/HEP supported research
  - 3 proposals had multiple areas of non-compliance with FOA requirements:
    - **2 did not contain a DMP and were outside the scope of HEP supported research + 1 did not contain a DMP and was from a 'for-profit' organization and thus did not meet FOA eligibility requirements**
- Additionally, 4 proposals that requested support for research across more than one HEP research subprogram (*i.e.*, "umbrella" proposals) were 'partially' declined without review in one of the HEP subprograms for not including DMP — but were reviewed in the other HEP subprogram(s)
- DOE PMs discussed with PIs alternate mechanisms at DOE to request support — proposals that were rejected for "technical" reasons could re-submit to general DOE/SC solicitation [DE-FOA-0001414]

# FY16 Reviewers & Panels

- For the FY16 HEP comparative review process, **134 proposals** were reviewed, evaluated and discussed by several panels of experts who met in the:

Research Subprogram	Panel Deliberations	# of Total Proposals Reviewed <small>[includes proposals containing multiple subprograms]</small>
Intensity Frontier	November 9-10, 2015	23
Accelerator Science and Technology R&D	November 12-13, 2015	30
Detector R&D	November 12-13, 2015	14
HEP Theory	November 16-18, 2015	37
Energy Frontier	November 18-20, 2015	29
Cosmic Frontier	November 18-20, 2015	36

- 25 of the proposals requested research support from two or more of the six sub-programs (“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.**
  - 209 reviewers participated in the review process. In cases where there were proposals on similar topics, reviewers were sent multiple proposals.
  - 796 reviews were completed with an average 5.9 reviews per proposal

# FY16 Review Data – by Proposal

	HEP Subprogram						HEP Total
	Energy	Intensity	Cosmic	Theory	Acc. R&D	Det. R&D	
Received	34	27	43	44	33	19	156
Declined Without Review	5	4	7	7	3	5	22
Reviewed	29 (6)	23 (10)	36 (21)	37 (14)	30 (14)	14 (10)	134 (69)
Funded	21 (0)	15 (3)	21 (8)	23 (2)	13 (3)	10 (6)	77 (20)
Declined	8 (6)	8 (7)	15 (13)	14 (12)	17 (11)	4 (4)	57 (49)
<b>“Success Rate” (%)</b> (Previous/New)	<b>72</b>	<b>65</b>	<b>58</b>	<b>62</b>	<b>43</b>	<b>71</b>	<b>57</b> (88/29)

## 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 FY15.
- “Success Rate” is = # Funded/ # Reviewed.
- Most proposals are not fully funded at their “requested” level.
- About 49% of the proposals reviewed were from research groups that received DOE HEP funding in FY15.
- Overall success rate of reviewed proposals in FY16 for previously (newly) funded groups was 88% (29%).
- 77 total grant awards funded in FY16 at \$39.89M [= 29.90M ‘renewal’ + 9.99M ‘new’ proposals].

# FY16 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 FY16 HEP comparative review FOA:
  - 57 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 based on comparative evaluations with 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



# FY16 Review Data — by Senior Investigator

	HEP Subprogram						HEP Total
	Energy	Intensity	Cosmic	Theory	Acc. R&D	Det. R&D	
Received	93	52	65	122	44	22	363
Declined Without Review	15	10	10	18	3	5	54
Reviewed	78 (12)	42 (19)	55 (34)	104 (28)	41 (18)	17 (12)	309 (111)
Funded	66 (2)	27 (6)	25 (9)	69 (8)	21 (6)	12 (7)	199 (31)
Declined	12 (10)	15 (13)	30 (25)	35 (20)	20 (12)	5 (5)	110 (80)
<b>“Success Rate” (%)</b> (Previous/New)	<b>85</b>	<b>64</b>	<b>45</b>	<b>66</b>	<b>51</b>	<b>67</b>	<b>64</b> (85/28)

## NOTES:

- ( ) indicates number of senior investigators that did not receive DOE HEP funding in FY15.
- “Success Rate” is = # Funded/ # Reviewed.
- Overall success rate in FY16 for previously (newly) funded DOE HEP PIs was 85% (28%).



# FY16 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	12 (7)	6 (1)	10 (2)	8 <sup>(a)</sup> (2)
Intensity Frontier	7 (6)	3 (3)	2 (0)	2 (0)
Cosmic Frontier	11 (10)	4 (4)	7 (3)	4 (1)
HEP Theory	14 (9)	10 (6)	1 (1)	0 (0)
Accelerator R&D	3 (1)	2 (0)	27 (11)	15 (3)
Detector R&D	1 (1)	1 (1)	2 (1)	2 (1)
<b>HEP Total:</b>	<b>48 (34)</b>	<b>26 (15)</b>	<b>49 (18)</b>	<b>31 (7)</b>

### NOTES:

- (a) DOE worked with U.S.-CMS or U.S.-ATLAS managements 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.
- Overall success rate in FY16 for 'all' (newly) funded DOE HEP Junior Faculty was 54% (44%)
  - Overall success rate in FY16 for 'all' (newly) funded DOE HEP Research Scientists was 63% (39%).

# FY16 Proposals vs. FY15 Status

	New Proposals		Research Efforts funded in FY15				Total
	Fund	Decline	Up	Flat	Down	No-Fund	
Energy Frontier	0	6	6	8	7	2	29
Intensity Frontier	3	7	7	1	4	1	23
Cosmic Frontier	8	13	5	6	2	2	36
HEP Theory	2	12	9	1	11	2	37
Accelerator R&D	3	11	3	3	4	6	30
Detector R&D	6	4	2	0	2	0	14

## DEFINITIONS:

- New/Fund = HEP research effort was not funded at this institution in FY15 but is funded in FY16.
- New/Decline = HEP research effort was not funded at this institution in FY15 and is not funded in FY16.
- Up = FY16 funding level +2% or more compared to FY15.
- Flat = FY16 funding level within  $\pm 2\%$  of FY15.
- Down = FY16 funding -2% or more compared to FY15.
- No-Fund = No funding is provided in FY16. This effort was funded in FY15.

# Full Funding of Multi-Year Grants

- **Section 310(D) of the 2014 Consolidated Appropriations Act (CAA), passed by U.S. Congress on January 17, 2014 and subsequent legislations enacted thereafter, 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 2016.
- **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.**

# FY16 Review Data — Full Forward Funding

Research Subprogram	# Proposals Reviewed	# Proposals Funded	# Multi-Year Grant Awards Fully Forward Funded (Period > 1 year)	\$k TOTAL: FY16 (1 <sup>st</sup> year of project period)	\$k TOTAL: FY16 (over <i>entire</i> multi-year project period for Fully Forward Funded grants)
Energy Frontier	29	21	0	0	0
Intensity Frontier	23	15	3	365	940
Cosmic Frontier	36	21	9	1,117	2,766
HEP Theory	37	24	9	1,850	5,670
Accelerator R&D	30	13	6	855	2,855
Detector R&D	14	10	6	902	1,831
<b>HEP Total:</b>	<b>134</b>	<b>77</b>	<b>33</b>	<b>5,089</b>	<b>14,062</b>

## 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 CAA and legislations thereafter apply.  
*The ‘approved’ project period for a grant is greater than 1 year.*
- **\$k TOTAL: FY16 (1<sup>st</sup> year of project period)** = funds applied only towards the 1<sup>st</sup> year of the project period. Reflects the total amount allocated for up to 12-months of Fiscal Year 2016 for these multi-year grant awards.
- **\$k TOTAL: FY16 (over entire multi-year project period for Fully Forward Funded grants)** = total amount provided from the FY16 HEP budget for fully forward funded grants for the entire duration of the multi-year project period.
- **Section 310(D) of 2014 CAA and legislations thereafter applied to ~43% of the proposals funded in the FY16 HEP Comparative Review process.**
- **Difference between the last two columns provides a measure of the “effect” of FY16 fully forward funded HEP comparative review grants = \$8.97 M total; does not include “trivial” case of fourteen 1-year awards totaling \$2.59M**
- **For Ref:** Out of 134 proposals reviewed, total # of incoming multi-year proposals with ‘*budget requests*’ over a project period < 1M\$ was 30 proposals (~22.4% of proposals reviewed).

# FY12–16 Review Data: Proposals & PIs

	HEP Total – by Proposals (across all 6 subprograms)				
	FY12 Review	FY13 Review	FY14 Review	FY15 Review	FY16 Review
Received	136	185	129	146	156
Declined Without Review	14	23	5	7	22
Reviewed	122	162 (58)	124 (71)	139 (79)	134 (69)
Funded	85	101 (20)	62 (17)	63 (16)	77 (20)
<b>“Success Rate” (%)</b> (Previous/New)	<b>70</b> (—)	<b>62</b> (78/34)	<b>50</b> (85/24)	<b>45</b> (78/20)	<b>57</b> (88/29)

	HEP Total – by Senior Investigators (across all 6 subprograms)				
	FY12 Review	FY13 Review	FY14 Review	FY15 Review	FY16 Review
Received	253	504	285	326	363
Declined Without Review	21	42	8	13	54
Reviewed	232	462 (113)	277 (97)	313 (128)	309 (111)
Funded	162	338 (40)	178 (31)	174 (24)	199 (31)
<b>“Success Rate” (%)</b> (Previous/New)	<b>70</b> (—)	<b>73</b> (85/35)	<b>64</b> (82/32)	<b>56</b> (81/19)	<b>64</b> (85/28)

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





# Lessons Learned

- **DOE/HEP re-evaluated method and schedule to obtain [mail-in] reviewer's written evaluations in PAMS — in a timely manner — in order to process and assemble all the reviews prior to convening the subprogram panels**
  - **FOA issued: early-July ⇒ proposal submission deadline: Sept. ⇒ review process: end-Sept.–Nov.**
    - **Such a schedule seems to be adequate for project period of each award to begin by *at least* April 1 of the following calendar year**
  - **HEP begins communicating recommendations for an award within 120 days of proposal deadline, faster than other peer agencies**
  
- **For continual improvement of process, we implemented past lessons learned – e.g.,**
  - **Strongly encourage panelists to write any additional comments made during the panel deliberations into PAMS prior to adjourning**
  - **Organized PI Meetings in August 2015 at APS/DPF Meeting (U. Michigan) to provide 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 ICHEP organizers to hold next PI meeting & sessions with DOE Program Managers at ICHEP-2016 on August 3-10, 2016 at Sheraton Grand Hotel (Chicago)**
  
- **DOE/HEP continues to assess feedback for further improvements**
  - **Some FOA requirements originate from DOE Office of Science and cannot be changed, while others are from incorporating lessons learned thru reviewers' feedback in past review cycles**
  - **Where possible, HEP considering ways to improve the experience for proposers and reviewers**
  - **HEP is considering adding more explicit statements on program scope/priorities in the FY17 FOA**



# Closing Remarks

- **With the FY16 FOA, DOE/HEP completed the 5<sup>th</sup> round of the annual university comparative review process**
- **With respect to the FY15 Comparative Review**
  - **FY16 had similar number of total proposals and PIs**
    - **134 proposals (FY16) vs. 139 proposals (FY15)**
    - **309 senior investigators (FY16) vs. 313 senior investigators (FY15)**
    - **HEP has been continually evaluating project periods to smooth out expected distributions in yearly comparative review cycle**
  - **Overall proposal average success rate higher (57% in FY16 vs. 45% in FY15; 5-year average = 57%)**
    - **PIs and groups have become better aligned with DOE's program, mission, and P5 priorities**
  - **Number of Junior Faculty 'reviewed' increased by 30%; number of Junior Faculty 'funded' +24%**
  - **"Effect" of Fully Forward Funded awards increased by \$4.74M; and impacts different subprograms differently**
- **FY16 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 substantially affects most subprograms**
  - **Additional details in the next HEPAP talk by G. Crawford**
- **To guide PIs and research groups towards the FY17 review, DOE/HEP organizing PI meeting sessions at ICHEP-2016 in August at Chicago**

# **REFERENCE SLIDES**

# Comparative Merit Review Criteria

*(In descending order of importance)*

## 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? Is the Data Management Plan suitable for proposed research and to what extent does it support the validation of research results? 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

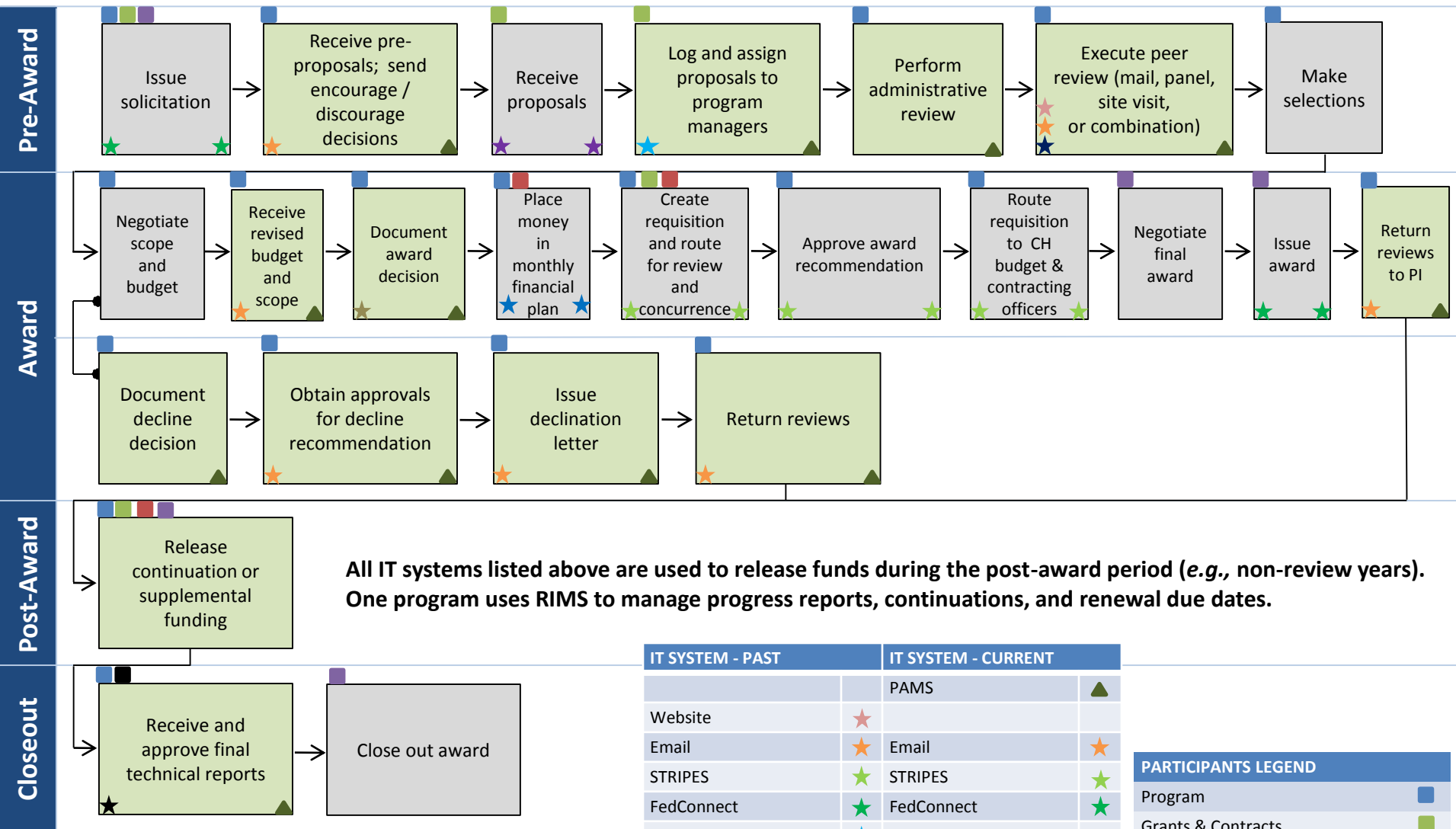
*For e.g., How does the proposed research of each senior investigator contribute to the mission, science goals and programmatic priorities of the subprogram in which the application is being evaluated? Is it consistent with HEP's overall mission and priorities? For PIs proposing to work and/or transition 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) 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. Include any comments if there are significant or unique elements of the overall proposal, including institutional setting/resources/synergies with other relevant subprograms, or other broader considerations.*

# 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**

# 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)
<b>Funding Tier 1</b> (require minimum budget adjustment)	University A	University D	University H		
<b>Funding Tier 2</b> (require average budget adjustment)	University B University C	University E University F	University I University J University K University L	University O	
<b>Funding Tier 3</b> (require maximum budget adjustment)		University G	University M University N		University Q <i>(e.g., term soft-landing)</i>
<b>Tier 4: No Fund</b>				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 1<sup>st</sup> order guide when DOE PMs later made funding decisions