Astrophysics
Division

Astrophysics Division Research & Analysis Review

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Astrophysics Division

Astrophysics R&A Elements

- Core R&A Program
  - Astronomy & Physics Research & Analysis (APRA)*
  - Astrophysics Theory & Fundamental Physics (ATPF)*
  - Astrophysics Data Analysis Program (ADP)*
  - Origins of Solar Systems (SSO)*
- Mission Guest Investigator Programs
  - X-ray Timing Explorer (RXTE)
  - GALEX*, Swift*, Suzaku*, GLAST*
  - Hubble, Chandra, Spitzer
  - XMM, INTEGRAL
- Mission science teams for the above missions, plus those in development
  - JWST, Kepler, SOFIA, WISE

* Investigations solicited through ROSES

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Astrophysics Research Budget

For *FY2008*, the following aggregates the competed Astrophysics research budget excluding flight hardware development

- Core Astrophysics R&A……..…… $68M
- Mission Guest Observer……..$70M
- Mission Science Teams……..……~ $60M
  - PI teams for missions and instruments selected through AO
  - Additional team members selected through competition
    - Participating scientists
    - interdisciplinary scientists
    - science working group members
- Total Astrophysics research and data analysis funding……~ $200M

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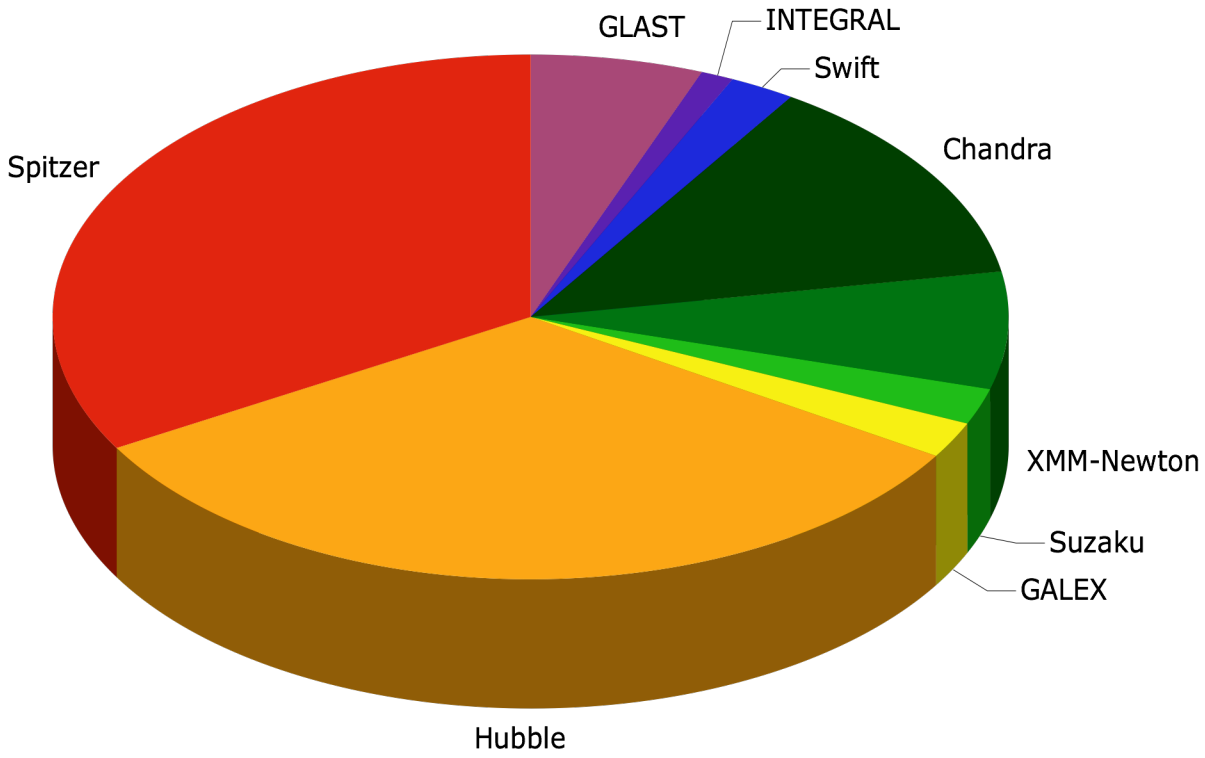
FY08 Astrophysics Mission GO Funding



Total FY08 Funding $70M

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FY08 Astrophysics Mission GO Funding

Oversubscription & Funding by Fiscal Year

Mission	Time Oversubscription (Last Cycle)	Due Dates for Next Cycle	Observing/Funding Dates of Next Cycle	Max. award duration (yr)	GO Funding Projections (M$) FY08	FY09	FY10	FY11	FY12	FY13
HST	5.6 (18%) (Cy 16)	Cycle 17: Mar 2008	Dec 08-Jun 09	2	22.3	24.7	25.0	23.9	20.8	20.0
Chandra	5.5 (18%) (Cy 9)	Cycle 10: Mar 2008	Dec 08-Nov 09	2	11.8	11.8	11.8	11.8	11.8	11.8
Spitzer	5.3 (19%) (Cy 5)	None	(Cy 5: Jul 08-Jan 09)	2	20.0	20.0	-	-	-	-
GLAST	3.5 (29%) $$ (Cy 1)	Cycle 2: TBD	TBD	3	4.5	8.0	8.3	8.6	8.9	8.0
WISE	-	No GO program	-	-	-	-	-	-	-	-
Kepler	-	TBD	TBD	TBD	-	1.3	1.3	1.3	0.8	-
GALEX	3.2 (31%) (Cy 4)	Cycle 5: Jun 2008	Jan 09-Dec 09	1	2.0	2.0	2.0	-	-	-
RXTE	5.4 (19%) (Cy 12)	None	-	-	-	-	-	-	-	-
Suzaku	3.5 (29%) (Cy 3)	Cycle 4: Dec 2008	Apr 09-Mar 10	1	1.0	1.0	1.0	1.0	1.0	-
Swift	6.0 (17%) (Cy 4)	Cycle 5: Oct 2008	Apr 09-Mar 10	1	1.8	1.5	1.5	-	-	-
XMM	7.8 (13%) (Cy 7)	Cycle 8: Oct 2008	May 09-Apr 10	1	5.7	5.7	5.5	5.5	5.5	5.5
INTEGRAL	1.7 (58%) (Cy 5)	Cycle 6: Apr 2008	Aug 08-Jul 09	1	1.0	-	-	-	-	-
WMAP	-	No GO program	-	-	-	-	-	-	-	-
TOTALS					70.1	75.9	56.4	52.1	48.8	45.3

Notes:

ALL operating missions' GO funding lines may change as a result of the upcoming Senior Review (Apr 22-25).

HST Funding Projections include COS GTO funding

Chandra: Effects of FY12, FY13 budget cuts are still being evaluated. Current numbers assume a scenario where the same GO funding is maintained, although they will also present at their Division PPBE briefing the impacts of a commensurate reduction in GO funding.

Spitzer Cycle 5 duration depends on how long the cryogen lasts.

GLAST Cycle 1 was a funding opportunity, therefore the oversubscription factor in this case is for dollars rather than observing time.

GLAST and Kepler GO funding projections are subject to change during the upcoming PPBE discussions.

INTEGRAL oversubscription factor is for proposals, not time. Time oversubscription factors are not available from ESA.

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Astrophysics Mission GO Funding

Oversubscription & Funding by Solicitation

	Cycle #	Most Recent Cycle Funding	Number of Proposals Submitted	Number of Funded Investigations	Dollars per Investigation	Proposal Success Ratio	Time Oversubscription
GLAST	1	$4,500,000	167	42	$107,143	25%	($) x3.5
Swift	4	$1,800,000	144	49	$36,735	34%	x6.0
Suzaku	2	$1,700,000	156	66	$25,758	42%	x4.1
GALEX	4	$1,700,000	99	35	$48,571	35%	x3.5
Hubble	16	$26,200,000	821	189	$138,624	23%	x5.6
Chandra	9	$11,000,000	663	177	$62,147	27%	x5.5
Spitzer	5	$25,400,000	720	258	$98,450	36%	x5.3
XMM-Newton	7	$5,600,000	330	102	$54,902	31%	x7.8
INTEGRAL	5	$1,000,000	30	25	$40,000	83%	x1.7
TOTAL or AVERAGE		$78,900,000	3130	943	$83,669	30%	x4.9

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Astrophysics R&A Elements

$72M in FY2008

- **Astronomy & Physics Research & Analysis (APRA)**
  - **Disciplines**
    - Particle Astrophysics
    - Gamma-Ray
    - X-ray
    - UV/Optical
    - IR/Sub-mm/Radio
  - **Categories of Investigations**
    - Suborbital Investigations
    - Detector Development
    - Supporting Technology (Optics, Coatings, Coronagraphs, …)
    - Laboratory Astrophysics
    - Ground-based
- **Astrophysical Theory & Fundamental Physics (ATFP)**
- **Origins of Solar Systems (SSO)**
- **Astrophysics Data Analysis Program (ADP)**

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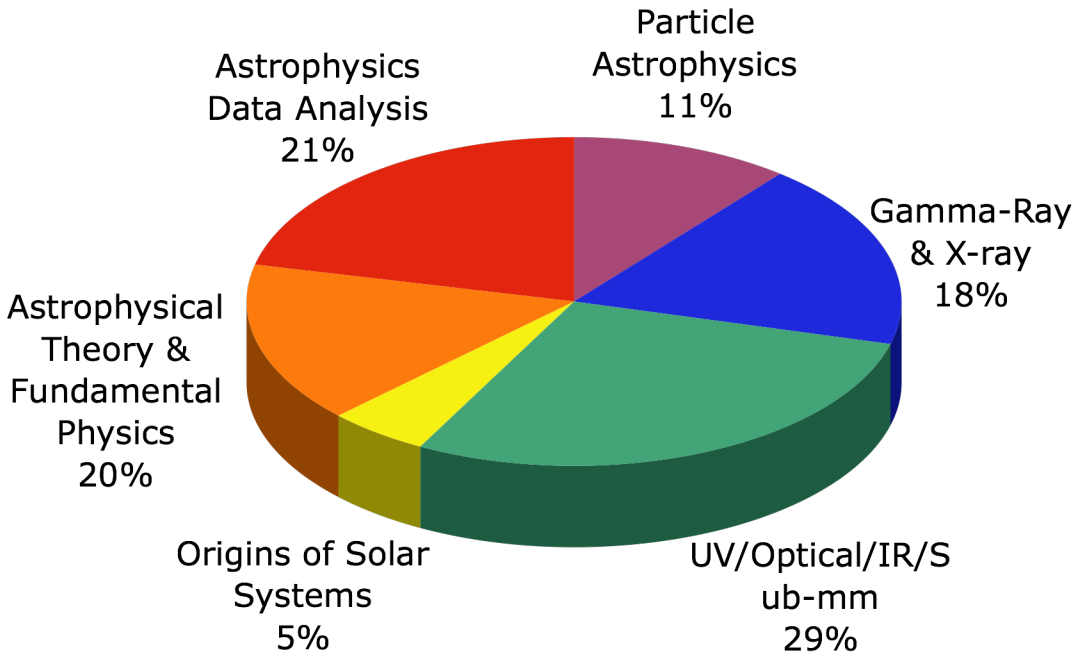
FY2008 Astrophysics R&A

Funding Distribution by Discipline



Total FY08 Funding $68M

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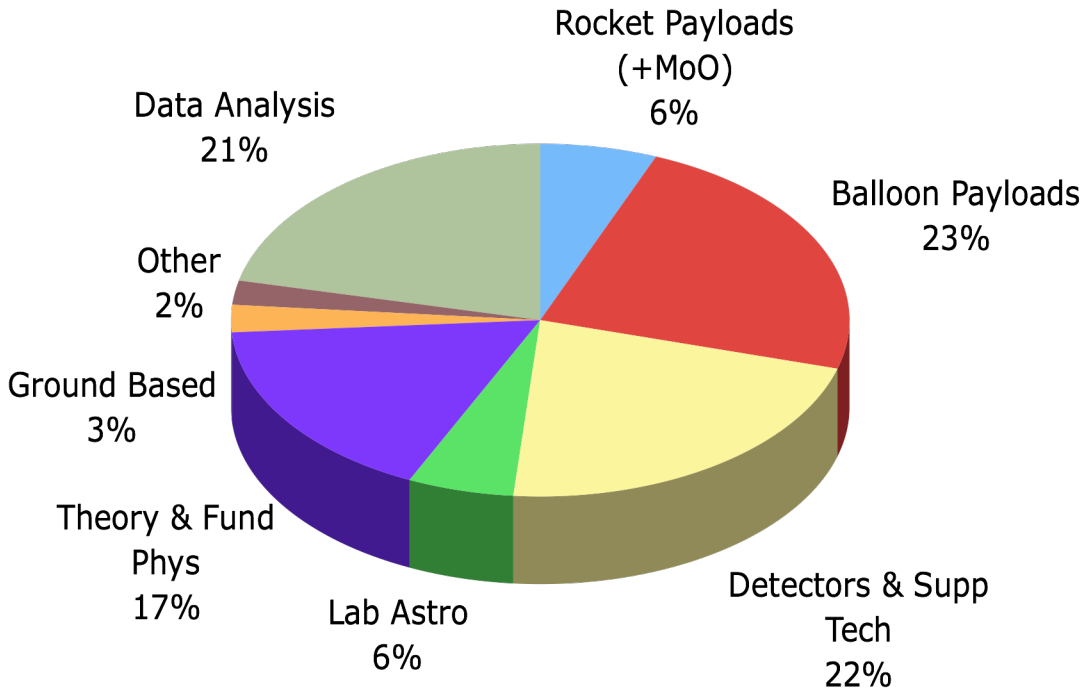
FY2008 Astrophysics R&A

Funding Distribution by Category



Total FY08 Funding $68M

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Funding History by Level-3 WBS

	WBS	Final FY06 Targets	Final FY07 Targets	Initial FY08 Targets	Current FY08 Targets
High Energy Astro	399131.02.01	$ 14,779,227	$ 12,131,980	$ 11,306,593	$ 12,421,315
ATFP	399131.02.02	$ 10,245,457	$ 10,106,352	$ 9,469,512	$ 10,859,512
Particle Astro	399131.02.03	$ 8,543,526	$ 6,971,071	$ 6,531,797	$ 7,396,076
UV/Opt	399131.02.05	$ 6,486,966	$ 5,158,608	$ 4,833,544	$ 5,647,661
IR/Sub-mm	399131.02.06	$ 15,363,712	$ 12,146,210	$ 11,380,831	$ 13,297,713
Orig SS	399131.02.07	$ 4,149,617	$ 3,673,163	$ 3,441,703	$ 3,441,703
Other	399131.02.09	$ 337,664	$ 931,616	$ 559,020	$ 559,020
Astrophysics R&A		$ 59,906,169	$ 51,119,000	$ 47,523,000	$ 53,623,000
BEFS		$ 2,000,000	$ -	$ -	$ -
ASMCS				$ -	$ 3,938,000
ADP/LTSA		$ 15,188,960	$ 14,615,000	$ 15,213,000	$ 14,513,000
TOTAL R&A		$ 77,095,129	$ 65,734,000	$ 62,736,000	$ 72,074,000

Astrophysics Division

Astrophysics R&A

R&A Element	ROSES-2006 Accepted/ Submitted	ROSES-2006 Investigation Oversubscription	ROSES-2006 Dollar Oversubscription	ROSES-2007 Accepted/ Submitted	ROSES-2007 Investigation Oversubscription	ROSES-2007 Dollar Oversubscription	Due Date for Next Cycle	Maximum Award Duration
Astrophysics Theory & Fundamental Physics	32/174	5.4 (18%)	6.2 (16%)	37/181	4.9 (20%)	5.0 (20%)	June 2008	4 years
Origins of Solar Systems*	9/22	2.4 (41%)	2.6 (38%)	6/20	3.3 (30%)	2.8 (35%)	May 2008	4 years
Astrophysics Data Analysis	36/98	2.7 (37%)	2.8 (36%)	41/98	2.4 (42%)	2.1 (47%)	June 2008	4 years
Keck Time (PI Data Analysis Awards)								1 year
Astronomy & Physics Research & Analysis	34/128	3.8 (27%)	5.3 (19%)	52/146	2.8 (36%)	3.0 (33%)	April 2008	
By *Discipline*:								
Particle Astrophysics	2/7	3.5 (29%)	1.9 (52%)	8/11	1.4 (73%)	1.6 (62%)		
High Energy Astrophysics (X-ray & γ-ray)	10/27	2.7 (37%)	4.8 (21%)	14/35	2.5 (40%)	2.3 (44%)		
Low Energy Astrophysics (UV/Opt/IR/Sub-mm)	22/94	4.3 (23%)	6.3 (16%)	30/100	3.3 (30%)	3.1 (33%)		
Astronomy & Physics Research & Analysis	34/128	3.8 (27%)	5.3 (19%)	52/146	2.8 (36%)	2.4 (41%)	April 2008	
By *Category*:								
Rocket & MoO Payloads	2/8	4.0 (25%)	6.8 (15%)	6/12	2.0 (50%)	2.9 (35%)		5 years
Balloon Payloads	5/16	3.2 (31%)	7.0 (14%)	12/24	2.0 (50%)	2.1 (48%)		5 years
Detectors & Supporting Technology	17/67	3.9 (26%)	4.2 (24%)	21/75	3.6 (28%)	4.7 (21%)		4 years
Laboratory Astrophysics	9/28	3.1 (32%)	3.9 (26%)	11/26	2.4 (42%)	3.7 (27%)		4 years
Ground-based Observations	1/9	9.0 (11%)	14.5 (7%)	2/9	4.5 (22%)	3.7 (27%)		4 years

* Cross-disciplinary with Planetary. These figures reflect one panel (Detection & Characterization of Extrasolar Planets) out of five panels, but ~2/3 of all proposals are related to extra-solar planets.

R&A Element	Funding Projections (M$) FY09 Submit - Direct Budgets FY08	FY09	FY10	FY11	FY12	FY13
Astrophysics Theory & Fundamental Physics (ATFP)	10.9	12.2	13.1	14.1	14.3	15.1
Origins of Solar Systems (SSO)	3.4	2.9	2.9	3.1	3.1	3.0
Astrophysics Data Analysis (ADP)	14.5	15.8	16.9	17.2	21.1	21.6
Keck Time (PI Data Analysis Awards)	0.5	0.5	0.5	0.5	0.8	0.8
Astronomy & Physics Research & Analysis (APRA)	39.3	44.3	49.4	52.1	55.1	59.4
Particle Astrophysics	7.4	7.6	7.8	8.1	8.7	9.5
High Energy Astrophysics (X-ray & γ-ray)	12.4	14.9	17.1	18.0	19.1	20.7
Low Energy Astrophysics (UV/Opt/IR/Sub-mm)	19.5	21.8	24.6	26.0	27.3	29.2
Other	3.9	2.0				
R&A Total (without Keck)	72.1	77.2	82.3	86.5	93.7	99.1
Astrophysics R&A by Category:	72.1	77.2	82.3	86.5	93.7	99.1
Data Analysis (ADP)	14.5	15.8	16.9	17.2	21.1	21.6
Rocket & MoO Payloads	4.3	7.6	11.0	11.3	13.0	15.2
Balloon Payloads	15.8	15.6	16.5	17.2	18.6	20.2
Detectors & Supporting Technology	14.9	17.4	18.4	19.9	20.1	20.7
Laboratory Astrophysics	3.8	3.7	3.8	4.0	4.0	4.1
Ground-based Observations	1.9	0.5	0.4	0.4	0.4	0.0
Theory	11.4	12.3	13.1	14.1	14.3	14.9
Program Support & Other	5.4	4.2	2.2	2.4	2.4	2.4

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ROSES-2006 Statistics

Program	ROSES 2006 APRA-2007	ROSES 2006 APRA-2006	ROSES 2006 ATP/BEFS	ROSES 2006 ADP
# Received	146	128	175	98
# Funded	52	34	32	37
% Funded	36%	27%	18%	38%
$ Requested (1 yr)	$51,174,120	$39,901,252	$20,403,495	$7,599,000
$ Awarded (1 yr)	$20,912,206	$8,043,199	$3,294,916	$2,761,000
% Awarded	41%	20%	16%	36%
Success Fraction				
University	28/82=34%	19/69=28%	27/147=18%	31
FFRDC	4/13=31%	1/7=14%	1/8= 13%	0
NASA	19/48=40%	13/50=26%	4/16=25%	4
Private	1/3=33%	1/2=50%	0/4= 0%	1

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ROSES-2007 Reviews

Status Reports

Program Element	Program Officer	Proposals Due	Panel Review Complete	# of Proposed Investigations	# Panels/ Reviewers	Investi-gations Selected	Recent Activities
Kepler Participating Scientists	P. Marcum	05/18/07	08/09/07	37	3/28	8 (22%)	- Review completed. Selection letters sent.
Origins of Solar Systems (with Planetary Science Division)	Z. Tsvetanov	05/25/07	09/20/07	104	5/30	27 (26%)	- Review completed. Selection letters sent.
Astrophysics Theory and Fundamental Physics	R. Hellings	06/01/07	09/26/07	181	11/68	37 (20%)	- Review completed. Selection letters sent.
GALEX Guest Investigator - Cycle 4	Z. Tsvetanov	06/22/07	09/19/07	99	4/32	35 (35%)	- Review completed. Selection letters sent.
Astrophysics Data Analysis	J. Hayes	06/22/07	10/11/07	98	6/27	41 (42%)	- Review completed. Selection letters sent.
GLAST Guest Investigator - Cycle I	R. Harnden	09/07/07	12/19/07	167	4/33	42 (25%)	- Review completed. Selection letters sent.
Swift Guest Investigator - Cycle 4	R. Harnden	11/09/07	01/25/08	144	4/26	49 (34%)	- Review completed. Selection letters sent.
Suzaku Guest Observer - Cycle 3	L. Kaluzienski	11/30/07	02/12/08	120	4/24	~50 (40%)	- Review completed. Merging with Japanese proposals completed. Budget proposals due May.
Astronomy & Physics Research & Analysis - 2008	W. Sanders	03/28/08	06/13/08	~150	~10/60		

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ROSES-2007 Reviews

Performance Against Metrics

Program Element	Proposals Due	Panel Review Complete	SDD Signed	Notification Date (NRESS)	56-day Metric	150-day Metric
Kepler Participating Scientists	05/18/07	08/09/07	09/20/07	10/03/07	55	138
Origins of Solar Systems (with Planetary Science Division)	05/25/07	09/20/07	11/01/07	10/26/07	36	154
Astrophysics Theory and Fundamental Physics	06/01/07	09/26/07	10/31/07	12/05/07	70	187
GALEX Guest Investigator - Cycle 4	06/22/07	09/19/07	11/09/07	12/17/07	89	178
Astrophysics Data Analysis	06/22/07	10/11/07	11/01/07	11/07/07	27	138
GLAST Guest Investigator - Cycle I	09/07/07	12/19/07	After Phase 2	01/25/08	37	140
Swift Guest Investigator - Cycle 4	11/09/07	01/25/08	03/05/08	03/26/08	61	138
Suzaku Guest Observer - Cycle 3	11/30/07	02/12/08	After Phase 2	03/07/08	24	98
Astronomy & Physics Research & Analysis - 2008	03/28/08	06/13/08				

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ROSES-2006 Reviews

Program Element Title	Due Date	Notification Date	150-day Metric	# Props Received	# New Selected	% Selected
Astronomy and Physics Research and Analysis (Investigations)	14-Apr-06	27-Oct-06	196	128	34	27%
Astrophysics Theory	2-Jun-06	13-Dec-06	194	118	20	17%
Beyond Einstein Foundation Science	2-Jun-06	13-Dec-06	194	56	12	21%
Origins of Solar Systems	2-Jun-06	26-Mar-07	297	22	9	41%
Astrophysics Data Analysis	23-Jun-06	22-Dec-06	182	98	37	38%
GALEX Guest Investigator -- Cycle 3	7-Jul-06	3-Jan-07	180	76	34	45%
Swift Guest Investigator -- Cycle 3	28-Jul-06	24-Jan-07	180	88	40	45%
FUSE Guest Investigator -- Cycle 8	15-Sep-06	1-May-07	228	108	68	63%
Suzaku Guest Observer -- Cycle 2	1-Dec-06	30-Mar-07	119	164	64	39%
Astronomy and Physics Research and Analysis -- 2007 (Investigations)	13-Apr-07	15-Aug-07	124	146	52	36%

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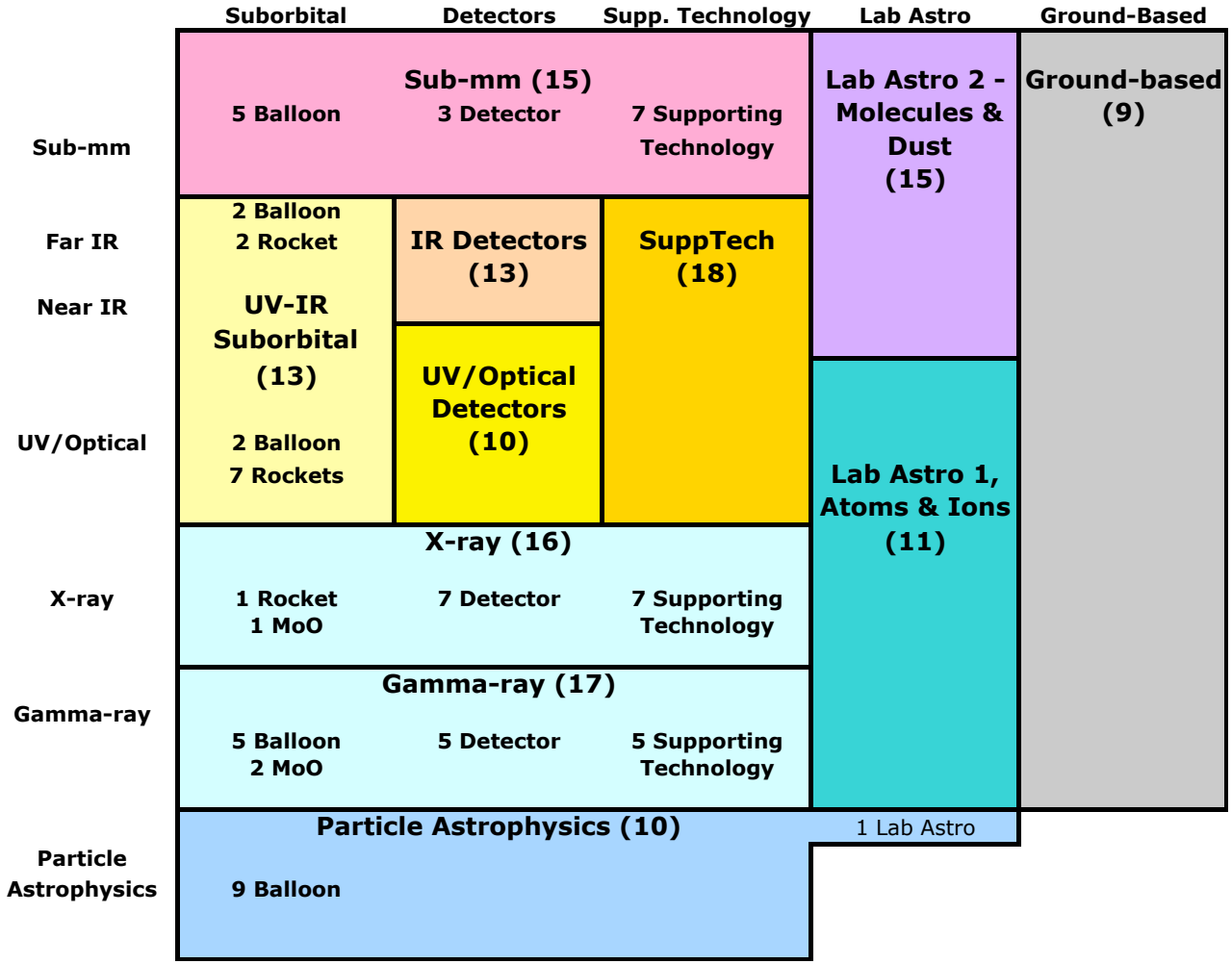
APRA-2007 Review Panels



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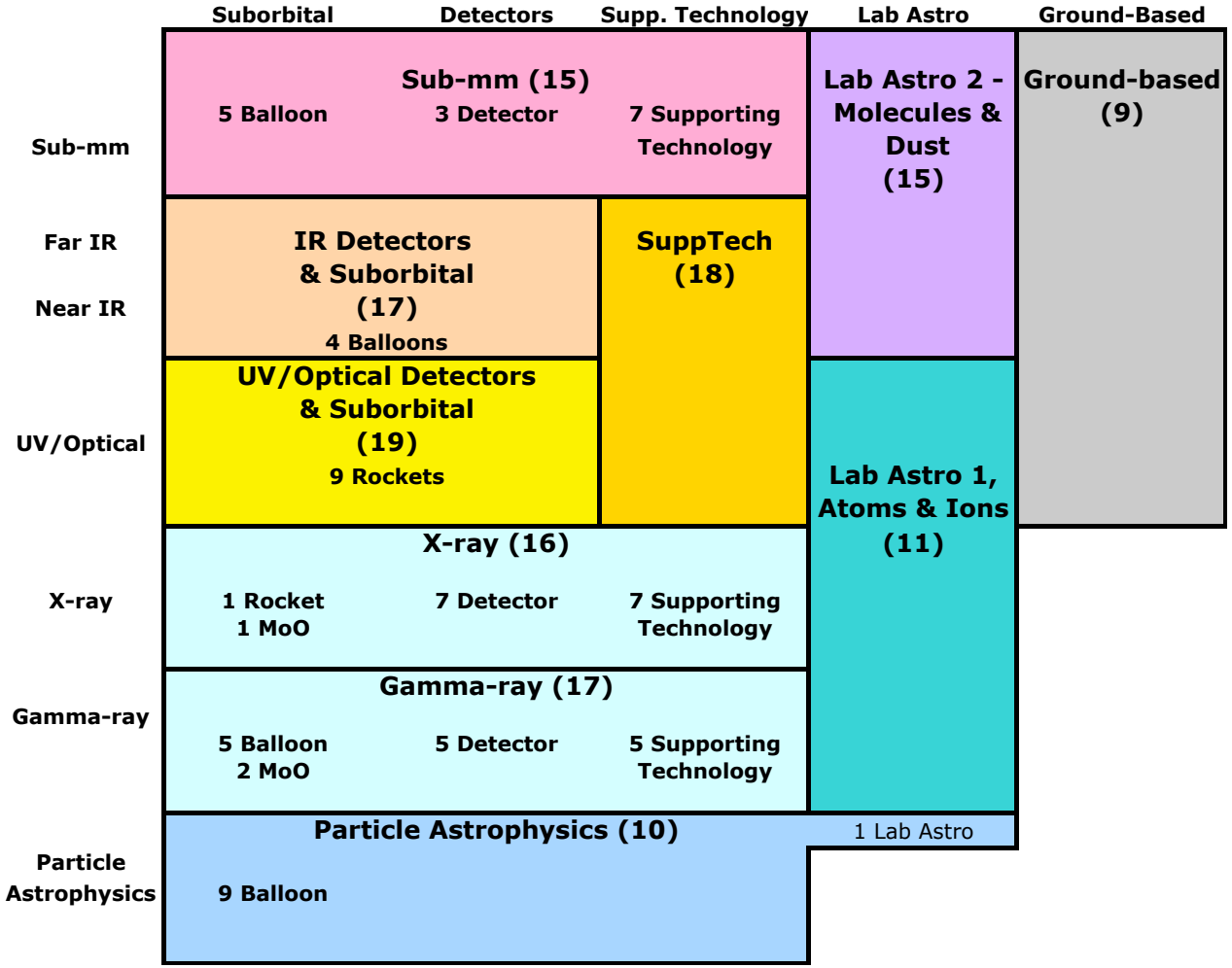
Alternate APRA Review Panels



Astrophysics Division

Astrophysics Fellowships

- NASA's named postdoctoral fellowships, like those at universities, are meant to be highly prestigious positions for cutting-edge, independent scholarship and vehicles to career growth for bright, young researchers
  - The last Decadal Survey commented that named fellowships are more enabling for career advancement than long-term research grants such as LTSA
  - Postdoctoral fellowships offered through Astrophysics funding have proliferated in recent years
    - We now have Hubble, Chandra, Spitzer, Michelson, and GLAST fellowships, with others being contemplated
    - The new plan is designed to retain the prestigious nature of the named fellowships

Astrophysics Fellowships

Astrophysics Division proposes:

- Part I:
  - Following the re-organization of Astrophysics into science-based themes, consolidate to three named postdoctoral fellowships, one for each theme, and include a suborbital fellowship:
    - Cosmic Origins (Hubble)
    - Physics of the Cosmos (Einstein)
    - Exoplanet Exploration (TBD)
    - Astrophysics Suborbital Fellowships (postdoctoral level)
  - Fellowships will be administered and reviewed through each program by an appropriate contractor
    - In the near-term, the goal is to retain the total number of postdoctoral fellowships offered through Astrophysics funding
    - Over the long-term, the fellowship opportunities will not depend on which missions come and go, but on the science opportunities that drive current and future missions
    - Streamline administration and review to maximize funding for the research

Astrophysics Division

Astrophysics Fellowships

- Part II: Introduce Senior Fellowships in each program for mid-career and senior researchers
  - Funds highly talented members of the community at 100% for several years
  - Captures the essence of former LTSA opportunity by allowing integrated, multi-investigation research programs to be funded through a single proposal
  - Funding for 3 years, with possible extension for 2 additional years pending review
- Part III: Graduate student suborbital fellowships:
  - Graduate students would receive support to participate as funded investigators on the development of a suborbital payload at another institution
  - Enhances PI training opportunities at no expense to the PI institution's suborbital program
  - Suborbital payload PI would write letter of sponsorship as part of the student proposal (the same way that the named fellowships require proposed mentors to send in a letter of endorsement)
  - Issues:
    - How much salary, travel to cover; are these more like internships?
    - Other mechanisms (NESSF, space grant) could conceivably be modified to include student suborbital fellowship category

Astrophysics Division

Astrophysics Institutes

- Potential Institutes
  - Laboratory Astrophysics
  - Cosmology (Dark Matter & Dark Energy)
  - Origins of Solar Systems
  - Exoplanet Research
  - Black Hole Physics
  - Enabling Technology
- Foster interdisciplinary research
- Block grants to institutes to lower workload and obligate funds quickly

Astrophysics Division

Changes for ROSES-2008

1. ROSES-2008 APRA allows grants of up to 4 years for Detector Development, Supporting Technology, Laboratory Astrophysics and Ground-Based Proposals. Suborbital Investigations will remain at up to 5 years.
2. ROSES-2008 allows 4-year awards for ATFP, ADP, and SSO
3. ROSES-2008 APRA encourages suborbital proposals to establish absolute photometric standards across the electromagnetic spectrum.
4. ROSES-2008 APRA was amended to include technology and training as factors of intrinsic merit:
   - "For suborbital proposals, specific factors that will be considered when evaluating a proposal's intrinsic merit are the scientific merit, the degree to which it advances the technology readiness level of a detector or supporting technology, and the degree to which it advances the readiness of junior researchers or graduate students to assume leadership roles on future NASA space flight missions."