

NSF/AST Outlook



AAS Town Hall
Jim Ulvestad
January 9, 2012

Outline

- Research, Facility, and Proposer News
- Budget Outlook
- Portfolio Review



2011 Nobel Prize in Physics

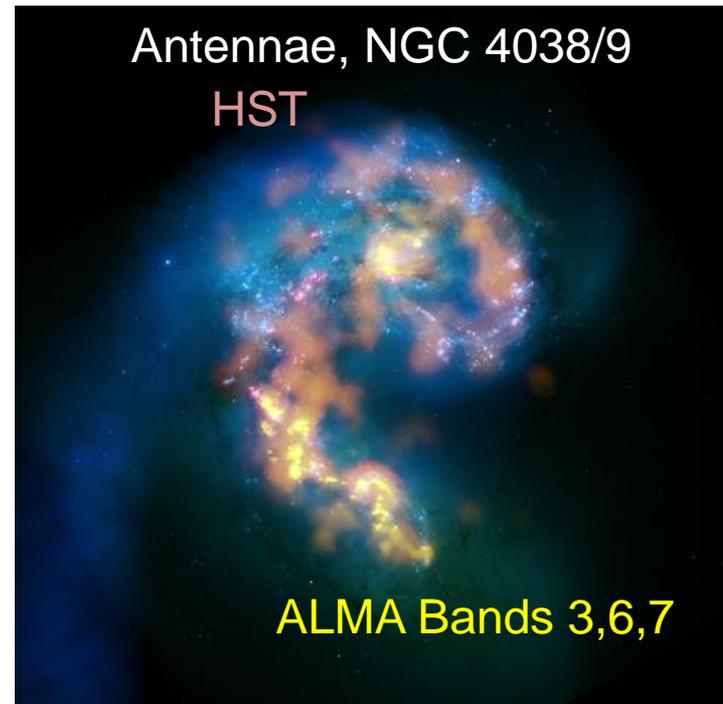
- Discovery of accelerating universe/Dark Energy
 - Saul Perlmutter, Adam Riess, Brian Schmidt
- Numerous individual investigator grants to Bob Kirshner at Michigan and Harvard in 80s/90s
 - Riess and Schmidt funded as Harvard grad students
 - Various other grants to co-investigators
- NSF Center for Astroparticle Physics: UC Berkeley
- Key supernova discoveries and identifications at Blanco 4m telescope at CTIO (NOAO)
 - Supporting observations/follow-up at KPNO, Gemini
 - Also Keck spectroscopy “pre-TSIP”



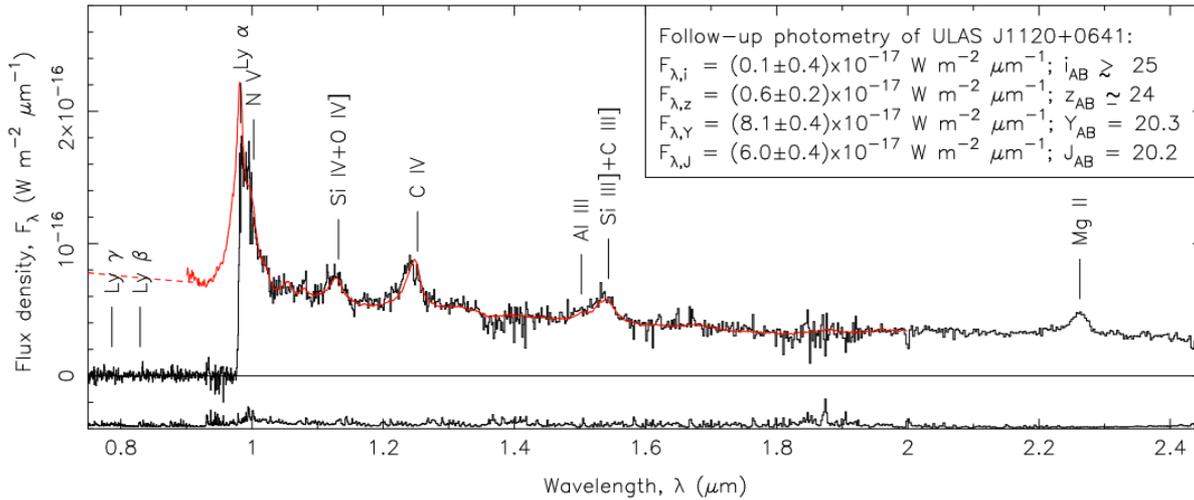
ALMA

- Early science started on 30 September
 - 112 projects selected from over 900 proposals for observation in Cycle 0
- 54 antennas now in Chile with 35 accepted; current delivery rate is ~2/month
- Final North American deliverables (antennas and receivers) on course for ~Sept 2012
- Inauguration in 2013

VLA HI

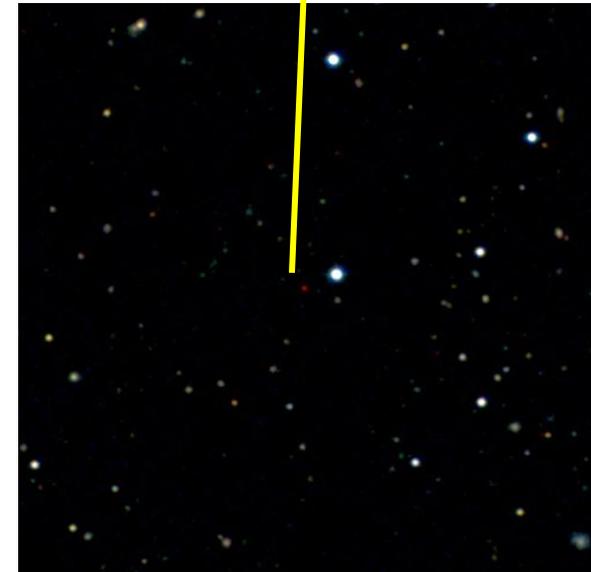
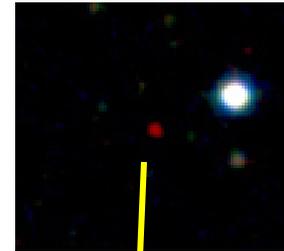


Gemini: ULAS J1120+0641 at $z=7.085$



- GNIRS + VLT spectrum of most distant QSO yet discovered. Massive black holes existed when universe was 750 MY old. IR-optimized Gemini was key to this discovery.

Mortlock et al. 2011, Nature, 474, 616

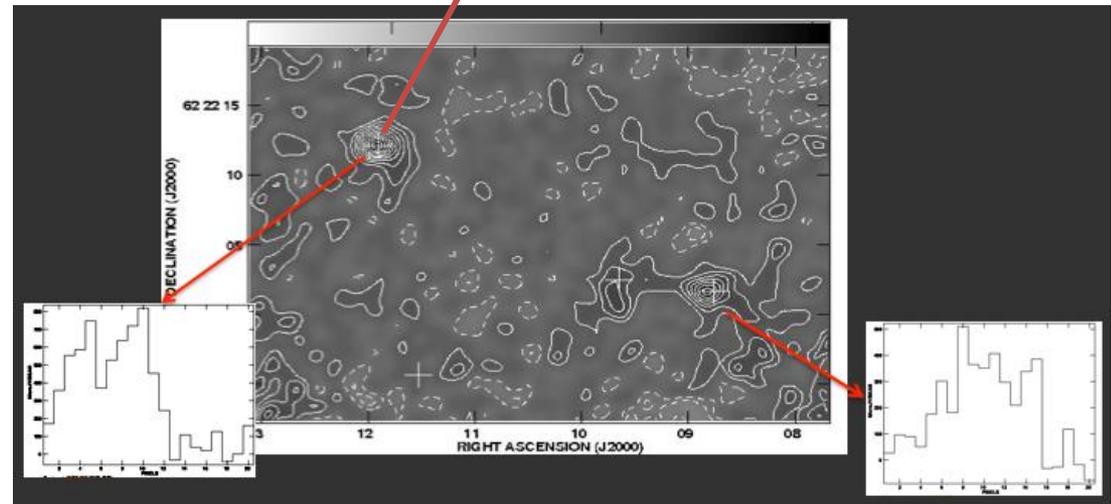


QSO is the red object in the center of the frame.

EVLA: Forming Cluster in Early Universe

- EVLA finds 10^{10} - 10^{11} M_{sun} of gas from CO observations of 3 galaxies at $z=4.05$
- 34 papers with first EVLA science in ApJL special issue, September 2011
- EVLA completion expected by end of 2012.

2" size, apparent ordered rotation



Carilli et al. 2011, ApJ, 739, L33

Facility News, see other sessions

- Substantial new capabilities from past decadal surveys are coming on line this decade, and will be available to the US community
- Gemini Town Hall, 12:45 p.m. Tuesday
- NRAO Town Hall, 6:30 p.m. Tuesday
 - ALMA session, 10 a.m. Wednesday
- NOAO Town Hall, 12:45 p.m. Wednesday
 - BigBOSS session, 2 p.m. Tuesday
- Arecibo: Management changeover; Booth 137
- NSO/ATST: See AURA, Booth 212-214



Division News

- New since 1/2011: Eric Bloemhof (Fed), Christer Watson (AAAS fellow), Ed Ajhar (rotator), Maria Womack (rotator)
- New rotator positions advertised, starting as early as summer 2012; application deadline Feb. 3, 2012
- The usual admonitions about proposals
 - Uncorrectable errors that cause Return Without Review
 - Need results from Prior Support for PI and all co-PIs
 - Broader Impacts missing from Project Summary
 - Advantage gained by disobeying font/margin rules
 - An NSF proposal is not just a recycled NASA proposal!
 - **Possibly** correctable errors include non-conforming bio sketches, endorsement letters, budgets, facility section
- Download your pdf file from Fastlane and look at it!



Budget Outlook

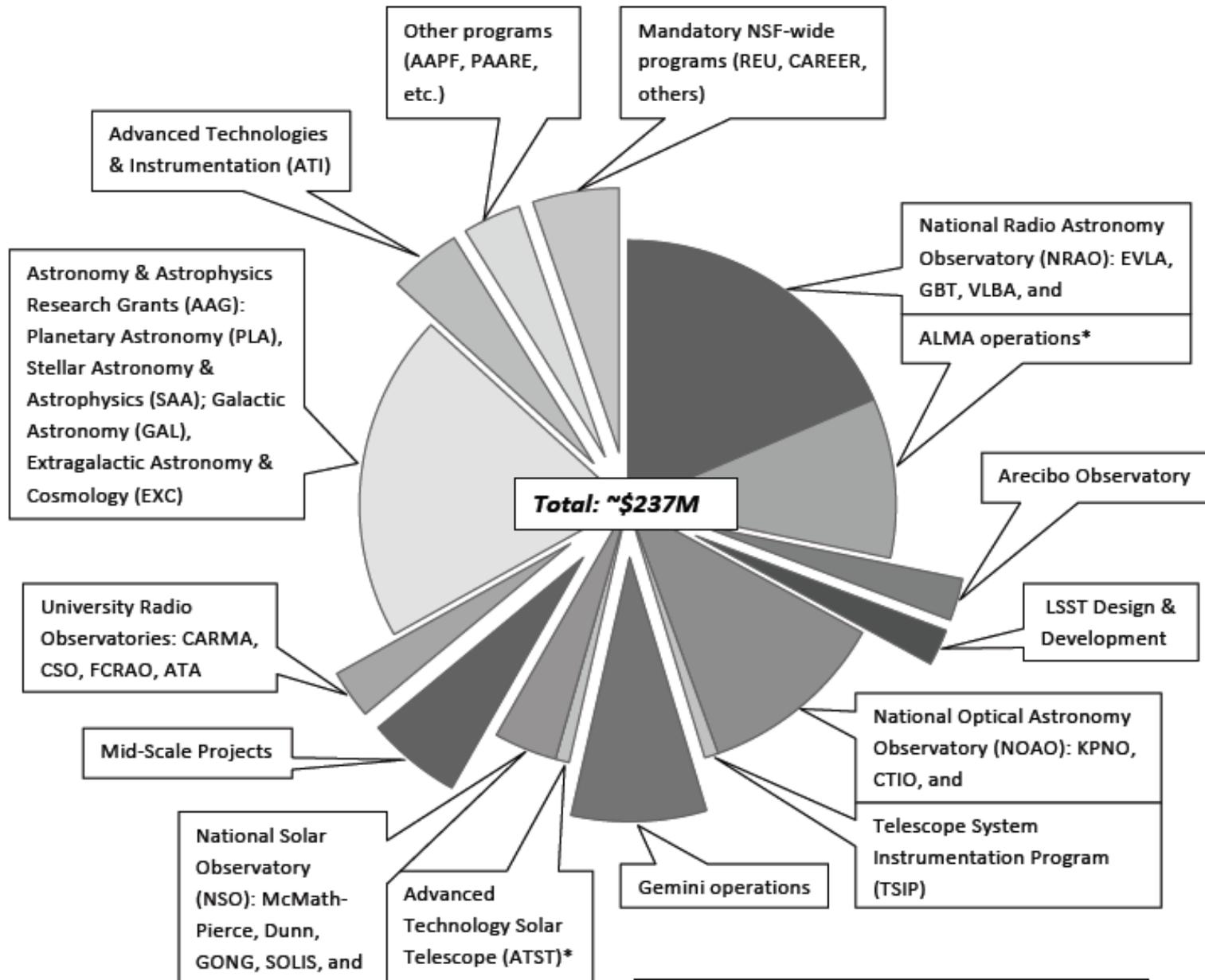


Budget Macro-Trends, Last 20 Years

- Several major facilities came on line 1993-2002
 - VLBA (1993); GBT (2000); Gemini (1999, 2002)
 - Facility ops costs were ~65% of AST budget in 2000-2002
- AST budget doubled in 2000-2010 decade
 - No new facilities became operational after 2002, so grants programs expanded dramatically
 - Facility ops costs were ~53% of AST budget in 2008
- This decade, budget is stagnant/decreasing
 - New major facilities (ALMA, ATST) will come on line
 - Strong increasing pressure on budget
 - Facility fraction of AST budget ~56% and headed upward
 - Little/no room for new decadal recommendations



A Snapshot of the AST Portfolio in FY 2011



FY 2011 and 2012 NSF Budgets

NSF & AST	NSF R&RA	%/prior yr	AST	%/prior
FY10 Approp.	\$5.62B	+9.1%	\$246.5M	+8%
FY11 Request	\$6.02B	+7.1%	\$251.8M	+2%
FY11 Approp.	\$5.56B	-0.9%	\$236.6M	-4%
FY12 Request	\$6.25B	+12.4%	\$249.1M	+5%
FY12 Approp.	\$5.72B	+2.9%	~\$234M	-1%

Appropriations to Major Research Equipment and Facilities Construction (MREFC) line in FY11 and FY12 were 30-40% below President's budget requests



FY 2013 Budget Outlook

- All signals are that AST budget will continue downward trend
 - OMB memo to agencies asks for 5% reductions in FY 2013 requests (relative to FY 2011), plus identification of options for reductions of more than 10% :

<http://www.whitehouse.gov/sites/default/files/omb/memoranda/2011/m11-30.pdf>

- Cumulative budget changes are already significant and having long-term impact in AST



Budget Bottom Line—Expectations and Aspirations Cannot be Met

1. All possible scenarios have 2015 AST purchasing power less than 2010
2. Committed operating costs for facilities coming on line increase by ~\$30M from 2010 to 2015
3. Cannot cover existing programs and commitments, let alone respond to Astro2010 recommendations
4. Before 2015, shortfall may be more than 20% of total AST budget of ~\$230M, without considering ANY of the Astro2010 recommendations



AST Response to Budget Shortfalls

- Planning for constrained budgets since 2010, by forward-funding actions, reducing outyear commitments, and program cuts
 - Managed to protect AAG and ATI in FY 2011, but they will be cut in FY 2012
- No new mid-scale projects started in FY 2012
- Note Congressionally mandated spending on Gemini and domestic NRAO in FY 2012 appropriation
- President's FY 2013 budget request to Congress next month may require further action if it follows public OMB guidelines



Decadal Survey Actions

- Current budgets are far below the most pessimistic scenario (flat purchasing power) assumed in Astro2010. However, we're working to move Astro2010 priorities forward.
 - LSST: Successful Preliminary Design Review
 - Midscale Innovations: Draft plan in place, not funded
 - GSMT: Solicitation for partnership selection is out, with caveat of no funding until (at least) 2020
 - CCAT: Design & Development funded; no immediate prospects for construction funding
 - Smaller items: Little/no funding available
 - Gemini direction from Congress
 - Aiming for Theory & Computation Networks start-up



Portfolio Review



Why Conduct a Portfolio Review?

- Foreseeable budgets will not be sufficient to meet the aspirations of the astronomical community
- Astro2010 advised: “If ... budget is truly flat ... there is no possibility of implementing ... the recommended program ... without ... enacting the recommendations of the first 2006 senior review and/or ... a second more drastic ... review before mid-decade.” (p. 240)
- Such reviews should be carried out periodically in any case, for responsible stewardship of the AST portfolio



PR Committee Membership

Daniel Eisenstein, Harvard (Chair)	Joe Miller, UCSC (Vice-Chair)
Marcel Agüeros, Columbia	Melissa McGrath, MSFC
Gary Bernstein, Penn	Michael Norman, UCSD
Geoff Blake, Caltech	Angela Olinto, U. Chicago
John Feldmeier, Youngstown St.	Karel Schrijver, Lockheed Solar
Debra Fischer, Yale	Michael Skrutskie, Virginia
Chris Impey, Arizona	Juri Toomre, Colorado
Cornelia Lang, Iowa	Rene Walterbos, New Mexico State
Amy Lovell, Agnes Scott	

- Do not contact members directly
- Provide input (≤ 5 pages) to astportfolio@nsf.gov by 31 January 2012



Starting Points are Decadal Surveys

- ***New Worlds, New Horizons*** Chapter 2 (Science Frontiers questions) and ***Vision and Voyages*** Chapter 3 are the driving forces
- Boundary conditions: No re-visiting the ordering of decadal survey recommendations, and no re-visiting of their science priorities
 - I.e., take decadal surveys as a “given”, and interleave their recommendations with existing capabilities
- “Capabilities” includes facilities, programs (including grants), and state of the profession



Two Phase Process

- Phase 1: Map the decadal survey science questions onto the capabilities needed to carry them out
 - This phase is nearing its conclusion
- Phase 2: Prioritize the capabilities that will maximize the progress on decadal survey science questions under severely constrained budget scenarios
- Report to MPS Advisory Committee by mid-2012
- After report acceptance, AST will develop implementation plan for response to recommendations



Community Input

- AST Portfolio Review is not a re-run of decadal surveys
 - PR committee has access to white papers, etc.
 - Assumes that the decadal surveys represent a good approximation to community consensus
- Community input solicited directly by AST until 31 Jan.
 - Limited to 5 pages in length
 - Responsive to committee charge
 - GOOD: Tied to Astro2010, suggests choices/tradeoffs
 - BAD: Reorder Astro2010, “just get more money”
- Public or national-facility blogs are NOT input to the Portfolio Review, are NOT being monitored by the PR, and should NOT be considered as replacements for thoughtful written input directly to the PR



Information and Input

- Information about portfolio review, including charge, reason for holding review, description of helpful (and unhelpful) input, etc., are at

http://www.nsf.gov/mps/ast/ast_portfolio_review.jsp

- Send input to

astportfolio@nsf.gov

