SIM Summary

M. Shao, S. Majewski, K. Johnston

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SIM Astrophysics

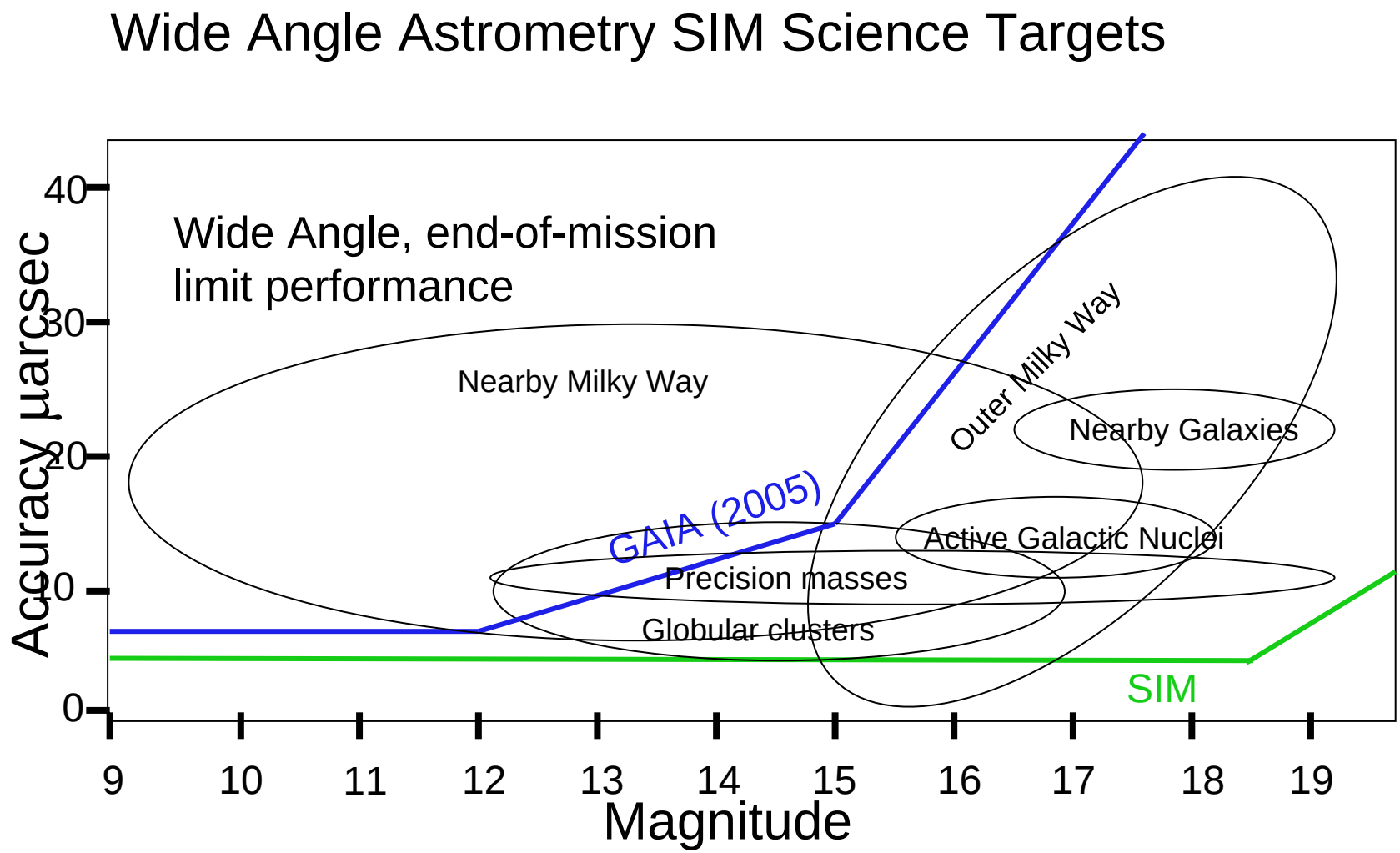
SIM is not just an exemplary planet finder / characterizer.

60% of SIM science time for non-planetary astrophysics

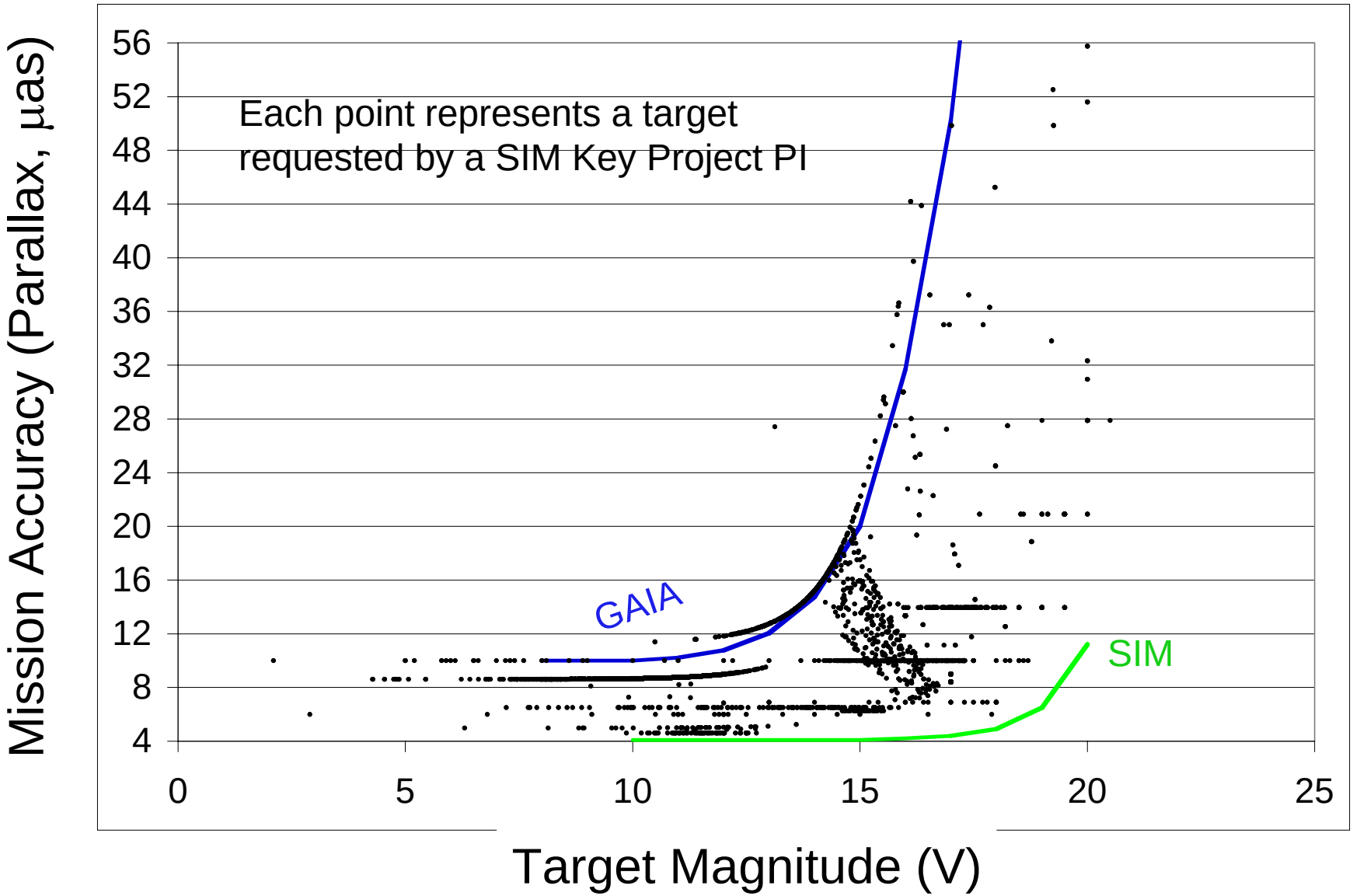
High precision astrometry applied to definitive studies of

- Distance scale problem
- Age scale (star clusters)
- Mass-luminosity relation
- Galactic structure / stellar populations / dynamics
- Dark matter (from galaxy scale to MACHO candidates)
- Local group dynamics / cosmology
- AGN structure
- Black holes, other stellar remnants, x-ray binaries
- Establish the inertial frame 50x more precisely than ICRF
- *Target of opportunity capability*
- PLUS: 1/3 of total science time still available for *new* cutting edge science goals

SIM vs. GAIA


Wide Angle Astrometry SIM Science Targets
Wide Angle, end-of-mission
limit performance
Nearby Milky Way
Outer Milky Way
Nearby Galaxies
Active Galactic Nuclei
Precision masses
Globular clusters
GAIA (2005)
SIM
Accuracy μarcsec
0
10
20
30
40
9
10
11
12
13
14
15
16
17
18
19
Magnitude

SIM Key Projects exploit unique capability



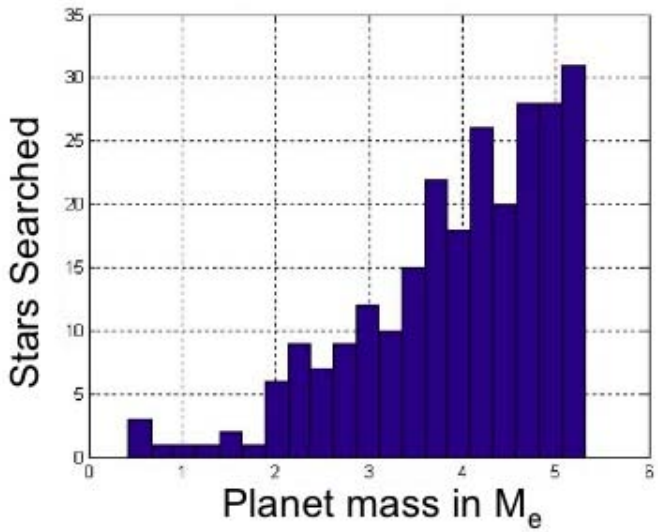
SIM's Planetary System Studies

SIM will find and characterize planetary ***systems***:

- Deep survey of 250 stars for terrestrial planets in habitable zone
- Broad survey of 2000 stars for Neptunes at 1-10 AU
- Survey of 200 young stars for Saturn/Jupiters at 1-10 AU

First mission to look for Earth-like planets around nearby stars

	Minimum Mass Planet Detected	Number of Stars Searched by SIM
Nearest →	< 1 M_e	5 stars
10 pc →	< 2	12
	< 3	45
	< 4	110
	< 5.3	250



The Facts About SIM Cost

- SIM Implementation cost (phase C/D) is $1,200M in fixed FY05$
  - Includes launch vehicle and reserves
- Phase C/D cost & schedule are extraordinarily robust
  - 54% budget reserve on the Instrument
  - 43% budget reserve on project cost excluding launch vehicle
  - 19% budget reserve on the launch vehicle
  - I&T/ATLO planned schedule longer than Spitzer and Chandra actuals
- A delay to 2015 will cost more, due only to extending Phase B and inflation
- In real-year dollars, the costs for a 2011 and 2015 launches are:

	2011	2015	Delta	
LRD				
Sunk Cost	$ 510M	$510M	zero	
Phase B 'to-go' (>FY06)	$ 340M	$800M	$460M	
Phase C/D cost	$ 800M	$890M	$ 90M	= $1.2B FY05$
Phase C/D Reserve (43%) & LV	$ 610M	$680M	$ 70M	= $1.2B FY05$
5-year operations	$ 460M	$540M	$ 80M	
Total:	$2,720M	$3,420M	$700M	

- The $3.4B cost represents 25 years of effort (FY'98-FY'23)!
- The Project is technically ready to launch in late 2011 and would save more than $700M