

# A BAO Broadband And Broad-beam (BAOBAB) Array

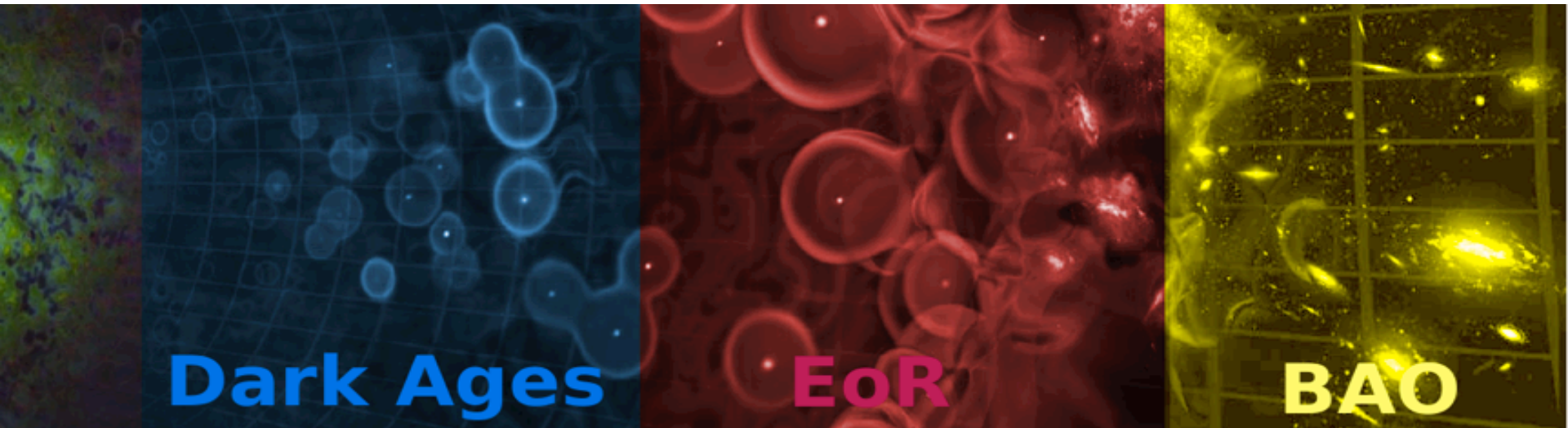
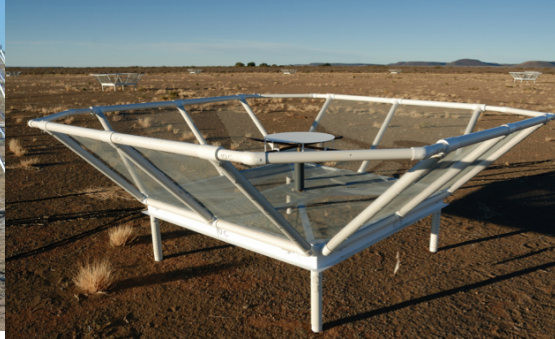
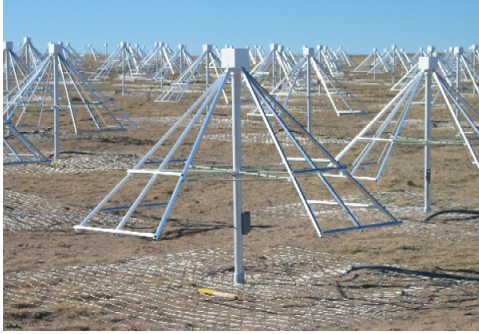


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# BAOBAB in the Context of 21cm Cosmology



$z = 100$  to  $20$   
15 to 70 MHz

$z = 20$  to  $5$   
70 to 240 MHz

$z = 5$  to  $0$   
240 to 1400 MHz

# BAOBAB-49 Specs

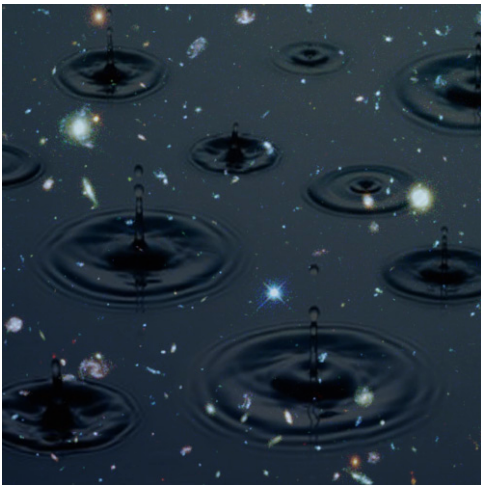
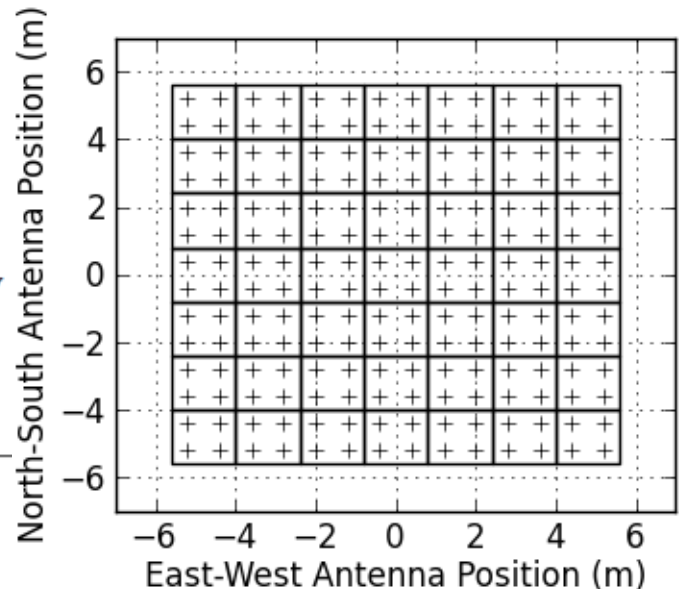
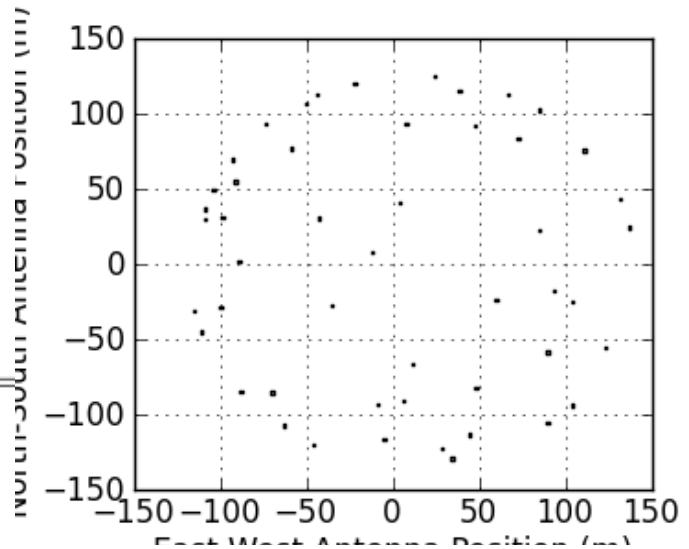


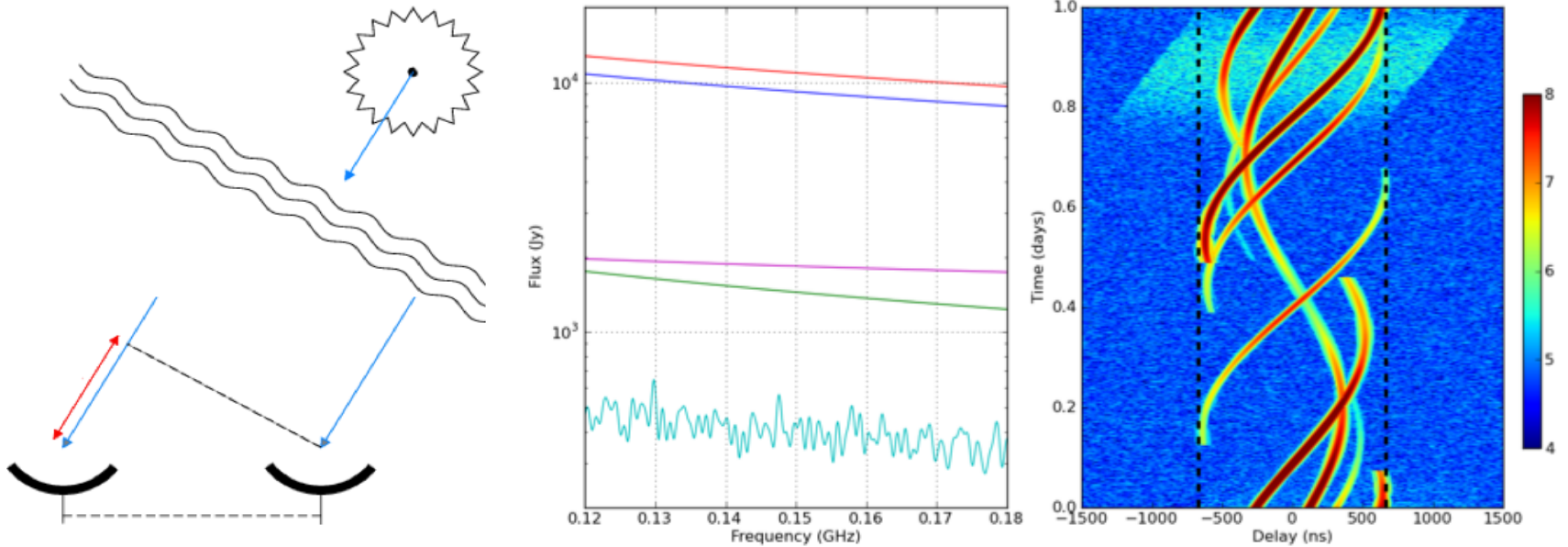
Table 2: Proposed BAOBAB-49 Array in Green Bank, WV

Operating Bandwidth	400–800 MHz
Number of Elements	49
Gain per Element	18 dBi
Field-of-View	0.15 sr
Receiver Noise Temperature	30 K
System Temperature	50 K
Maximum Imaging Baseline	60 m
Redundant Baseline Scale	1.6 m
$k_{\min}, k_{\max}$	0.025, $2.5h \text{ Mpc}^{-1}$
Array Configuration	Reconfigurable: Min/Max-Redundancy
Frequency Resolution	400 kHz
Snapshot Integration Time	10 s
Data Volume	6 TB for 60-day integration



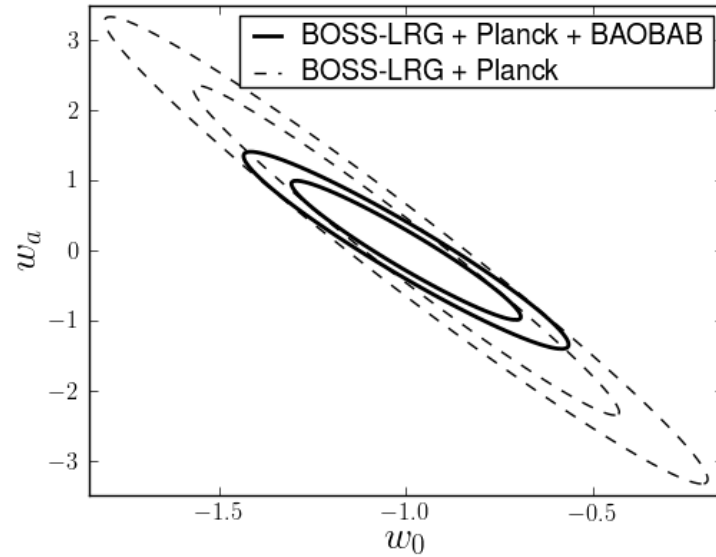
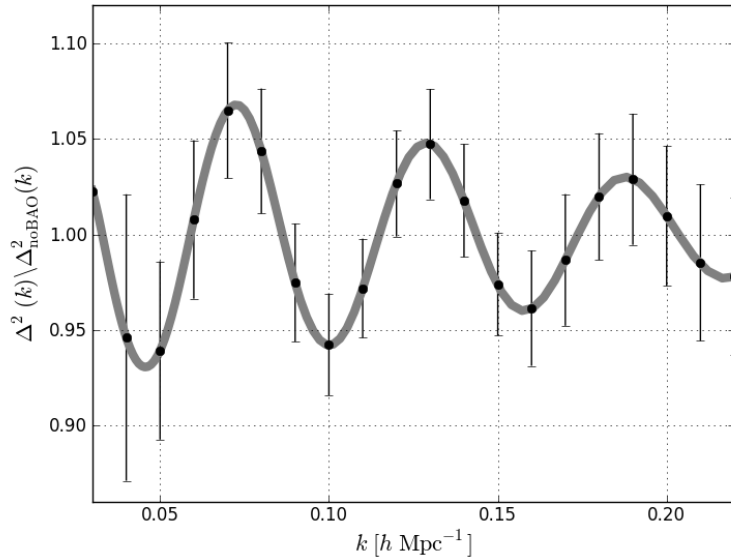


# The Delay-Spectrum as a Lens for Intensity Mapping



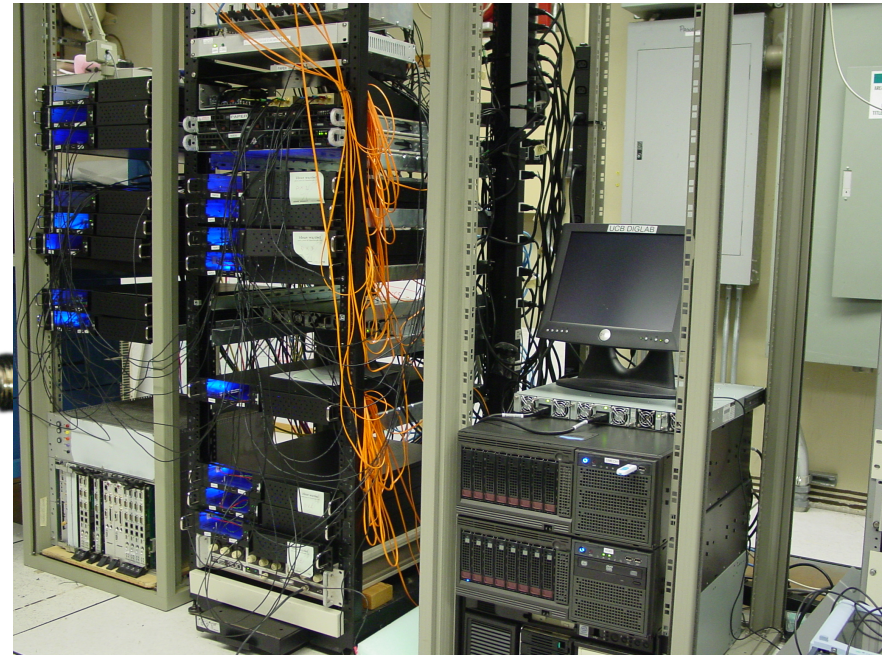
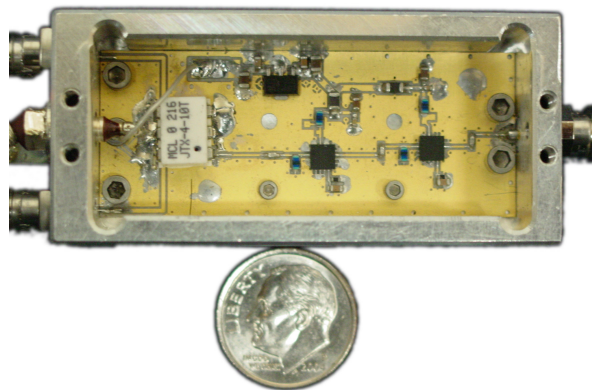
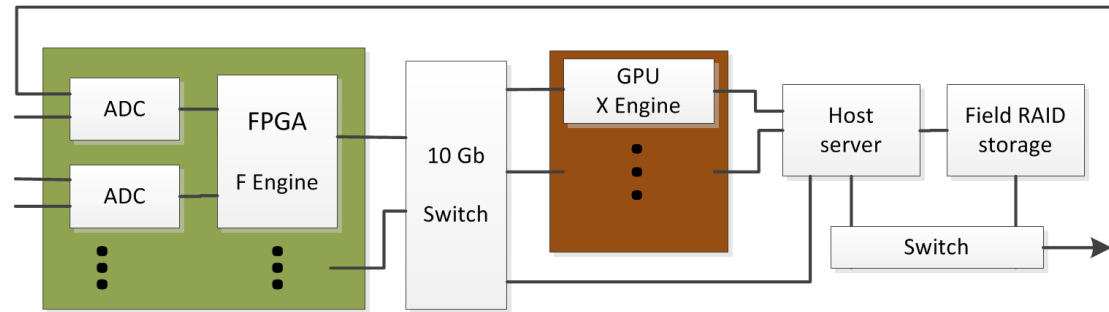
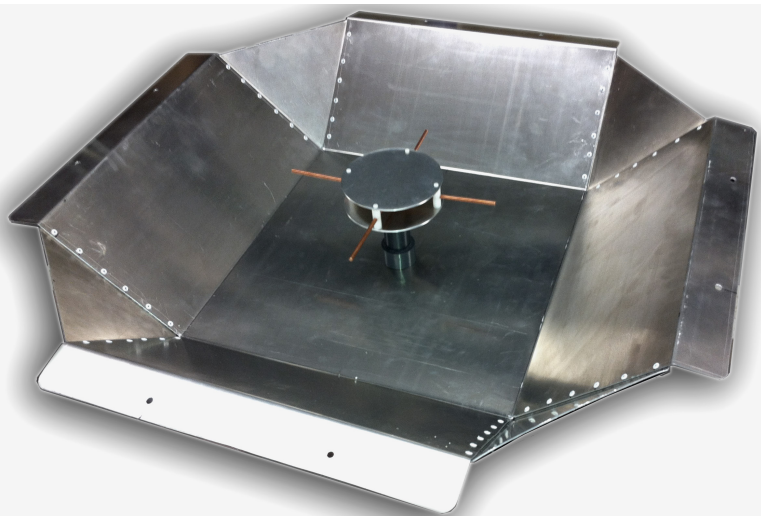
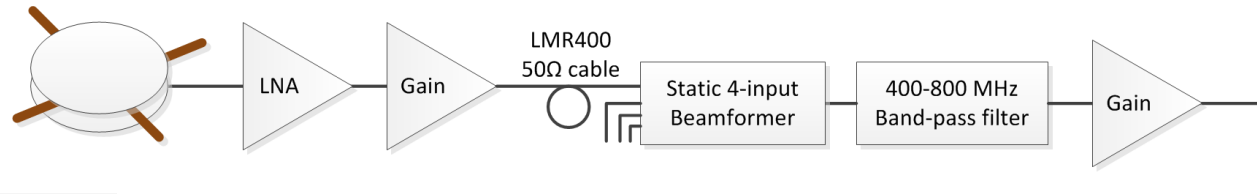
Upshot: at  $z=1$ , a  $\sim 20$ -wavelength (6m) baseline loses access to the first ( $k=0.08 \text{ h Mpc}^{-1}$ ) BAO peak.

# BAOBAB-132 Forecast



Survey	Redshift	$H(z)$ Error	$D_A$ Error	Correlation	$R$ Error
BAOBAB	0.89	6.7%	17.0%	0.72	3.5%
BAOBAB	1.18	4.9%	17.8%	0.73	2.7%
BAOBAB	1.58	4.4%	22.9%	0.74	2.5%
BAOBAB	2.16	3.9%	34.8%	0.73	2.4%
BOSS-LRG	0.35	1.8%	1.0%	0.41	0.7%
BOSS-LRG	0.6	1.7%	1.0%	0.41	0.7%
BOSS-Ly $\alpha$	2.5	3.1%	7.4%	0.58	2.0%

# BAOBAB's System Architecture





# BAOBAB-4: Leuschner Observatory

