

Galaxy Formation SWG report

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Science Use Cases

Galaxy Assembly

ID	Title
HiZ1	Cold gas in High-z Galaxies 1- The molecular gas budget
HiZ2	Cold gas in High-z Galaxies 2- CO as redshift beacon
HiZ3	Cold gas in High-z Galaxies 3- The dense ISM
HiZ4	[CII] 158um line emission from z=15 to 20 galaxies
HiZ5	Mapping High-z CO Gas
HiZ6	Low-surface-brightness CO
HiZ7	Continuum Surveys
HiZ8	Observing AGN feedback over cosmic time through deep, individual observations
HiZ9	Investigating Quasar Mode Feedback through the SZ effect
HiZ10	Probing Obscured MBH Accretion and Growth at Cosmic Dawn
HiZ11	Black hole accretion probed by linear and circular polarimetry
HiZ12	Observing magnetized galaxy evolution at z<0.5 and beyond

	Parameter	GFor/HiZ1: The Molecular Gas Budget	GFor/HiZ5: Mapping High- z CO Gas	GFor/HiZ7: Deep Continuum Surveys	Notes: Is there a case to be made for the magnetic Universe as a KSP?	KEY:
Feature Comparison						
Functional Capabilities & Features	Phased Array	0	0	0		0
	VLBI Recording	0	0	0		1
	Full Polarization Synthesis	1	1	6	useful for calibration/flagging purposes	2
	High Accuracy Linear Pol Measurements (0.1% Purity)	0	0	4		3
	High Accuracy Circular Pol Measurements (0.1% Purity)	0	0	2		4
	Accurate Autocorrelation (Total Power) Products	0	0	0		5
	Total Power Single Dish / Zero Spacing Element	2	0	0	intensity mapping	6
	Short Spacings (< 30 m)	0	2	0	IGM imaging	
	Reconfigurability	0	1	0	useful, but not at cost of antennas	
	> 3 SubArrays	0	0	0	2 subarrays good enough	
	1000 Spectral Channels	6	6	5	need <= 10km/s = 1MHz at 40GHz = 20000chan	
	> 64k Correlator Spectral Channels	0	0	0		
	Mosaic / On-The-Fly Mosaic	6	0	6	linear mosaic. Wide area with small structures	
Array Performance	Point Source Sensivity: 10x JVLA, ALMA	6	6	6		
	Surface Brightness Sensitivity: 5x JVLA, ALMA	4	6	5	survey requires sens at ~>1"; imaging: need sens at 0.1";	
	Survey Speed: 5x JVLA, ALMA	6	0	6		
Baselines	1 km	6	4	4		
	3 km	4	6	6		
	30 km	0	6	6		
	300 km	0	0	2	high res imaging AGN not part of this case	
	1000km	0	0	0		
	4000km	0	0	0		
RF / FE Features	High RF Dynamic Range (e.g., Solar)	0	0	0		
	< 1 GHz	0	0	1		
	1-4 Ghz	0	0	5		
	4-11 GHz	2	2	6	CO is gonna be hard; IM more relevant	
	11-50 GHz	6	6	6		
	70 - 115 Ghz	6	6	5	cold dust good	
	Future Multi-Pixel 70-115 GHz Option	3	0	3	too dear; novel FPA design to allow for shaping?	
	Circular Polarization Front End	0	0	0		
	> 2:1 BW Ratio	4	2	4		
> 20GHz BW	4	1	5			
Time Domain Features	Rapid Response Time (1 minute)	0	0	0		
	msec-scale Search Capabilities	0	0	0	commensal with continuum survey but not our group	
	< msec Search Capabilities	0	0	0		

Other	(Add your own.)				
Concepts - Comparison					
Concept A	18m Homogeneous Array	5	6	6	
Concept B	13/26m Heterogeneous Array	6	5	4	shorter baselines CGM imaging good; c
Concept XYZ	(Use the builder to make your own.)				