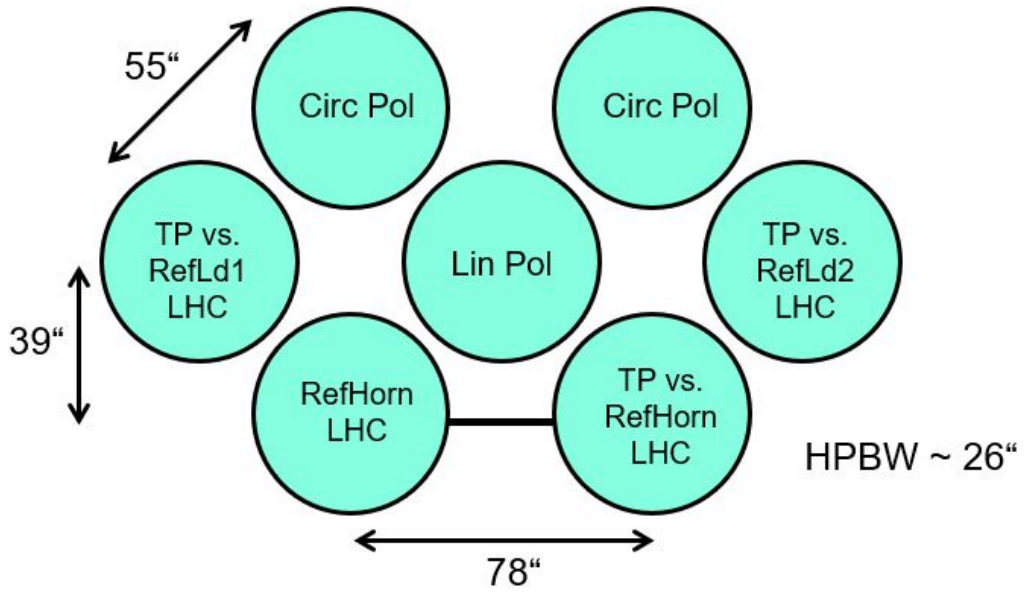
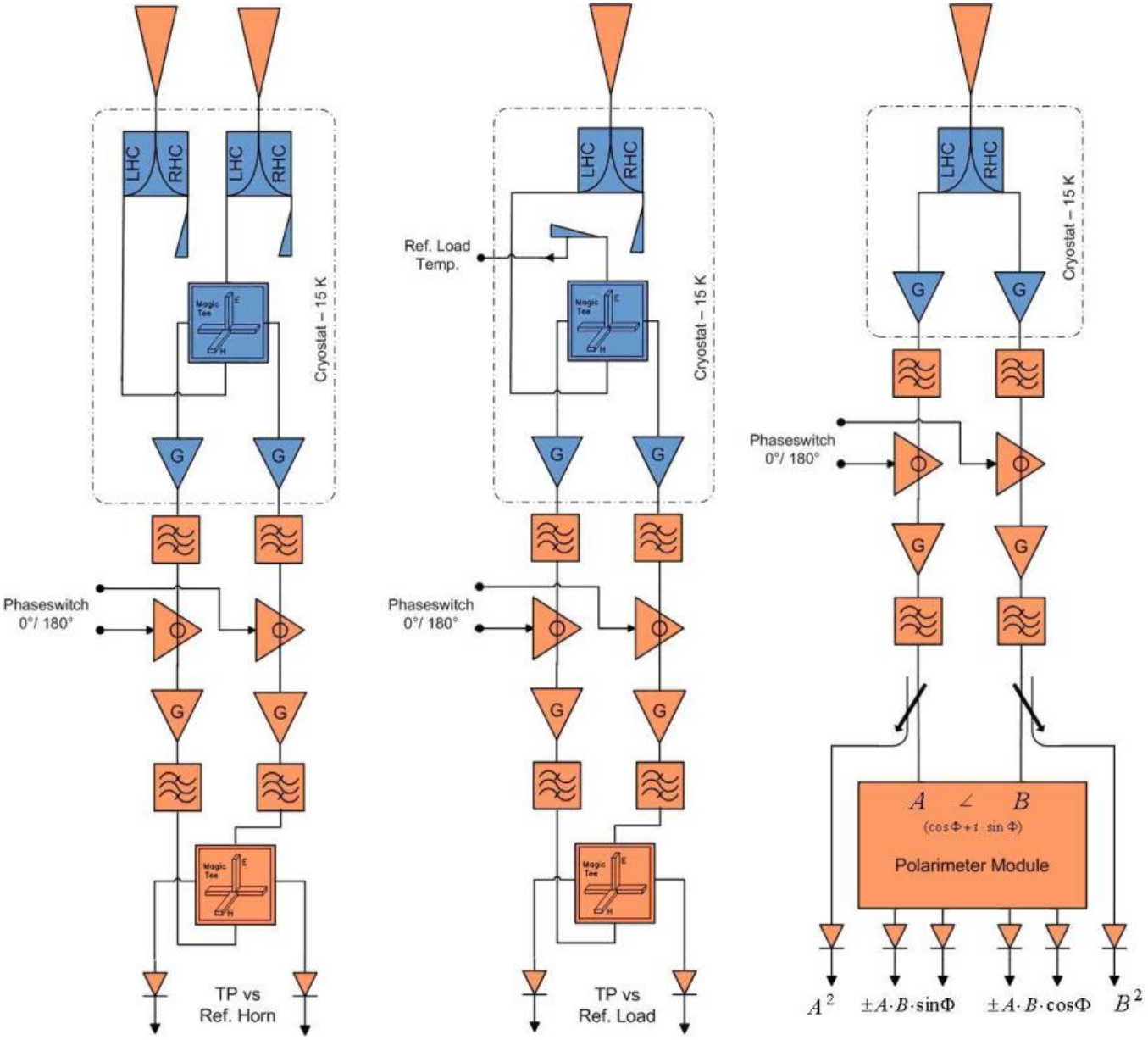
Technical Documentation of the EMBA Receiver 30 -34 GHz (S9mm)

Type	HEMT cooled	
Channels	12	(4 via V/F converters)
Receiver Noise	18 K - 24 K	(about 55 K System Noise Temperature)
Frequency range	33 GHz - 50 GHz	
Polarization	LHC/RHC or linear	see horn layout
Calibration	Noise diode	Transmitter optically coupled
IF	none	direct detection principle for continuum only

The receiver is a pseudocorrelation design similar to those used for WMAP / PLANCK that offers suppression of the 1/f noise resulting from gain fluctuations which are inherent to cryogenic InP HEMTs. There will be three polarimetry pixels available, 2 circular, 1 linear polarized. Another two pixels will be total power LCP, each referenced to an internal cold waveguide load whose temperature is accurately measured synchronously with the data from the RF detectors. Finally there is beam switch implemented in hardware with two horns differenced by means of a waveguide magic tee. In figure 2 a schematic sketch of the different types of RF channels that are implemented in the receiver is given. Since the receiver is laid out as a direct detection receiver, no mixing to an IF at a few GHz is carried out, all processing down to the final direct detection step is done at 30 - 34 GHz.



Horn layout of the7 beam 9mm receiver with beam spacing on sky indicated



Schematic diagram of the different types of RF channels for the7 beam 9mm receiver

Short description of the receiver (FS on 22.1.2008)