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(54) **PHOTONIC IMAGE REJECTION RF MIXER, A PHASED-ARRAY RADIO FREQUENCY RECEIVER IMPLEMENTING THE SAME AND RELATED METHODS OF OPERATION**

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(57) **ABSTRACT**

A photonic image rejection radio frequency (RF) mixer and a receiver implementing the same may suppress undesired mirror image signals having frequencies at a spectral location that is mirror-symmetric, with respect to a local oscillator (LO), to that of a signal of interest. An upconverted optical beam corresponding to a captured RF beam is extracted by an optical processor. The upconverted optical beam is mixed with the LO to obtain a desired composite optical signal and an undesired composite optical signal, each providing a corresponding beat frequency optical signal at the same frequency. The desired and undesired composite optical signals are captured by multiple optical pickups with relative phase shifts in their beat frequency optical signals which are converted into corresponding electrical signals and combined to suppress the undesired signal.