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(54) **METHODS AND SYSTEMS FOR ATOMIC CLOCKS WITH HIGH ACCURACY AND LOW ALLAN DEVIATION**

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(57) **ABSTRACT**

A system comprises a digital processing circuit, a frequency modulator, an amplitude modulator, and an adder. The digital processing circuit receives an input signal and a correlation signal and generates a frequency tuning parameter and an amplitude modulation parameter. The frequency modulator generates a frequency modulation signal and the correlation signal. The amplitude modulator receives the amplitude modulation parameter and generates an amplitude modulation signal. The adder receives the frequency tuning parameter and the frequency modulation signal and generates a control signal. In some implementations, the system further comprises a DC feedback circuit that receives the input signal and generates a DC compensation signal. In some implementations, the system further comprises a temperature sensor, a temperature compensation circuit, and a second adder.