

BICHROMATIC LASER FOR QUANTUM COMPUTING APPLICATIONS

ABSTRACT

A multi-frequency laser system comprises a master oscillator to generate a master beam and an arm splitter to split the master beam into a first beam and a second beam. The first beam is provided to a primary mode arm for generation of a primary mode beam and the second beam is provided to a sideband mode arm for generation of a sideband mode beam. The sideband beam arm comprises a modulator to modulate the second beam to generate a beam comprising sidebands; a filter to select a particular sideband mode from the beam comprising sidebands; an amplifier cavity to amplify the particular sideband mode and suppress other residual modes; and an acousto-optical modulator to shift the frequency of each mode of an amplified selected sideband beam to generate a sideband mode beam. The primary and sideband mode beams are provided in a coordinated manner to enact a quantum gate.

[Figure 1]