





Bidirectional channels for optical atomic clock with laser cooled ions

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Optical clock based on trapped and cooled single ion ⁴⁰Ca⁺





Discrete amplifier - ErDFA – C, L

Mature, inexpensive technology, widely deployed

Gain in C and L band. Limited by unwanted oscillations, noise higher compared to unidirectional application



Discrete amplifier - SOA – S, C, L

Broadband, but limited gain, partially polarisation sensitive, high noise, crosgain modulation Gain clamping (up) or holding beam injection (botom) improve part of problems

Distributed amplifier – Raman – S, C, L

High pump power in transmission fibres (hundreds of mW)

Broadband gain, limited by limited pump penetration, and low gain coefficient in standard G.652 fibres









Distributed amplifier - Brillouin – S, C, L

Very narrow band, usable gain bandwidth only about 15 MHz, high gain (50dB) for small signals Suitable as preamp for frequency transmision Pump must be locked approx. 10.9 GHz from transmitted signal, polarisation sensitive Use of RF generator and LiNbO₃ IQ modulator biased for SSB modulation probably too expensive. Lock-in amp might work. (to be verified)



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