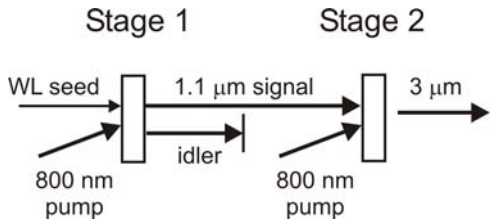
Tokmakoff Group

Potassium Niobate Based Optical Parametric Amplifier for Generating 45 Femtosecond Pulses at 3 μm

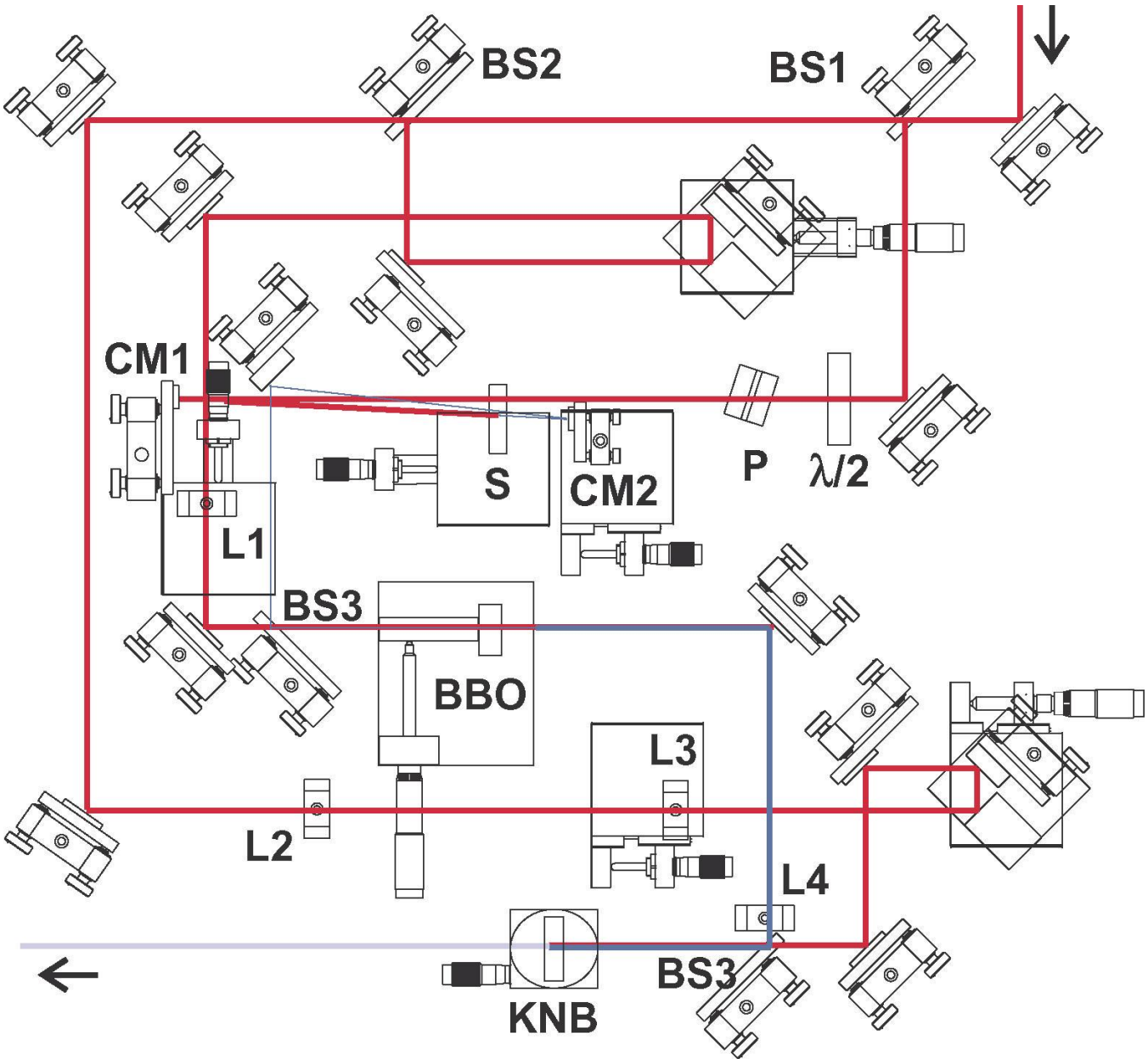
Taken from Chris J. Fecko, "Spectroscopic Investigations of Hydrogen Bond Dynamics in Liquid Water", Ph.D. Thesis, Massachusetts Institute of Technology (2003).

Please reference: C. J. Fecko, J. J. Loparo and A. Tokmakoff, "Generation of 45 femtosecond pulses at 3 μm with a $KNbO_3$ optical parametric amplifier," *Optics Communications*, **241** (2004) 521-528. doi:10.1016/j.optcom.2004.07.038

General mixing scheme:



Pumped with 30 femtosecond 800 nm pulses (400-700 uJ).



Experimental configuration of the 3 μm BBO/KNB OPA. (T = transmission, R = reflection, FS = fused silica, AR = anti-reflection coating) **BS1** CVI FS window, single-side AR800nm; **BS2** Femtolasers 37%R beamsplitter; **BS3** Cascade Optical custom beamsplitter, T800nm R1100nm, designed to minimize GVD for both beams; **CM1** and **CM2** CVI protected gold concave spherical mirrors, radius of curvatures 30 and 7.5 cm respectively; **L1**, **L2**, **L3** CVI FS plano lenses, focal lengths 28, 34 and –11.3 cm respectively; **L4** Newport BK7 plano lens, focal length 10 cm; **λ/2** CVI quartz zero order half wave plate; **P** Alpine Research Optics thin film polarizer, broadband design; **S** Meller Optics [0001]-cut sapphire disc, 1.5 mm thick; **BBO** Casix BBO crystal, 1 mm thick, θ=29.2° ϕ=0°, both sides AR800nm; **KNB** Spectrogen KNB crystal, 1mm thick, θ=41° (off b towards c) ϕ=0°, entrance side AR800nm; all unspecified optics are CVI protected gold plane mirrors.