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Subfemtosecond pulse synthesis via coherent broadband generation in Raman-active crystal[1] MARIIA SHUTOVA, ALEXANDRA ZHDANOVA, ALEXEI SOKOLOV, Texas A&M University — Subfemtosecond single- or sub-cycle broadband pulses of light are under active study because of their many applications; for example, detecting electron drift and atomic ionization; moreover, single cycle pulses offer the possibility of optical arbitrary waveform generation. Our group works on synthesizing such ultrashort pulses in ultraviolet-visible-near infrared range by making use of broadband generation in a Raman-active crystal. We have previously proven that the multi-color Raman sidebands generated in this way are mutually coherent and thus can be recombined to obtain ultrashort pulses of broadband radiation by proper phase alignment. We present a setup scheme which uses dichroic mirrors to combine near infrared pump and Stokes beams along with several sidebands in visible range in one beam in collinear scheme and control the phase of each sideband with nanometer precision. Finally, we examine the relative phase between each sideband by analyzing the beating of SHG and SFG signals generated in BBO crystal, moreover, the subfemtosecond duration of resultant pulse can be proved by looking at multiphoton ionization of xenon gas, since it has been shown that the ion yield is related to the duration of the pulse.

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