Abstract Submitted
for the TSS10 Meeting of
The American Physical Society

Chirped pulse Raman amplifier for two-color high-intensity laser-plasma experiments JAMES "JC" SANDERS, FRANKLIN GRIGSBY, RAFAL ZGADZAJ, MICHAEL DOWNER, University of Texas at Austin — The interactions of high-intensity lasers with a plasma are troubled by instabilities. A two-color laser pulse can be used to control these instabilities, but the intensities necessary to do this require that both colors have powers on the order of terawatts. Here, we present a scheme for generating terawatt, two-color laser pulses by using a three-stage amplifier system based on the stimulated Raman scattering of a chirped pulse. The first two stages consist of a Raman-shifter and a Raman-amplifier—two barium nitrate crystals—which works by first Stokes'-scattering a low-energy seed in the first crystal and then amplifying the seed via four-wave mixing to a few millijoules in the second crystal. The amplified first Stokes' pulse is then to be further amplified by a conventional Ti:Sapph crystal in a 6-pass bowtie configuration. The amplified beam has a peak wavelength of 873 nm and is to be compressed to the bandwidth limit (∼50 fs). It will then be re-combined with a conventionally generated TW laser centered at 800 nm and will be sent into the plasma.

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Date submitted: 22 Feb 2010 Electronic form version 1.4