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Raman amplifiers for powerful femtosecond pulses JAMES SADLER, LUKE CEURVORST, NAREN RATAN, MUHAMMAD KASIM, University of Oxford, RAOUL TRINES, PETER NORREYS, Central Laser Facility, DAN HABERBERGER, DUSTIN FROULA, JAKE BROMAGE, ANDREW DAVIES, JONATHAN ZUEGEL, LLE, MAX TABAK, LLNL — An ongoing experiment at LLE Rochester aims to generate the first Petawatt class laser pulse using Raman beam energy transfer in an underdense plasma. I will demonstrate PIC simulations optimising the setup and show how shaping the seed pulse gives a factor of two efficiency increase. At these experimental parameters, it was found that the optimal seed pulse is much shorter than that predicted by the self-similar Pi-pulse theory. Pending experimental verification of the 10%+ efficiency, I will show how currently active lasers could be configured in a "Kirkwood" two stage Brillouin-Raman amplifier to reach frontier level powers.

James Sadler
University of Oxford

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