# Influence of amplification on pulse shaping for coherent control applications

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We demonstrate here the importance of using low seed laser powers for amplification of shaped pulses in a typical setup for coherent control experiments. An acousto-optic programmable dispersive filter (Dazzler from FastLite) is used to shape 130 fs pulses before amplification. These devices hold many advantages as compared to other pulse shaping devices [1]. Pulse shaping must be done with care in this configuration, as will be demonstrated with a number of examples of measured pulse shapes before and after amplification.

Figure 1 shows the amplifier output power as a function of dazzler power setting, clearly indicating a saturation regime at average amplifier powers over 400 mW. Figure 2 shows measurements of an amplified unequal double pulse with set ratio 2:1 (also measured as such) for low and high seed powers. Clearly, at lower seed powers as in (a), the measured trace corresponds to approximately the 4:1 ratio expected, but at high seed powers this ratio changes towards 2:1, indicating the smaller of the two pulses being amplified and the main pulse saturated. This result demonstrates one example of the importance of using low seed powers to ensure the largest possible search space in coherent control experiments. More examples will be presented and discussed.
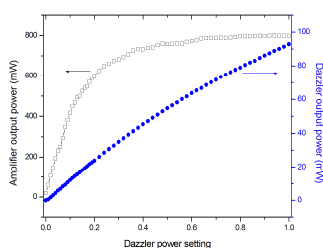


Figure 1: Amplifier output power and dazzler output power as a function of dazzler power setting.
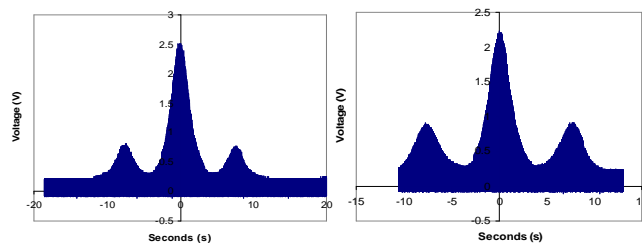


Figure 2: Autocorrelation traces of amplified 1:2 unequal double pulses for (a) low and (b) high seed powers, demonstrating saturation. Pulse separation is 500 fs.

## References
[1] F. Verluise, V. Laude, Z. Cheng, Ch. Spielmann, P. Tournois, *Opt. Lett.* **25**, 8 (2000).