





















measured stretcher group delay finds itself in practically perfect agreement with the simulated group delay curve. The agreement at three different grism separations indicates that this device can perform according to simulation within the tuning range. As for the spectral amplitude function, Fig. 3 gives a measured profile and shows that spectral transfer function indeed covers our design spectral range. Combined with the amplitude measurement, the spectral transfer function of our grism stretcher is now completely characterized. This scanning version of the SI should find wide applications in many system producing similar large dispersions.

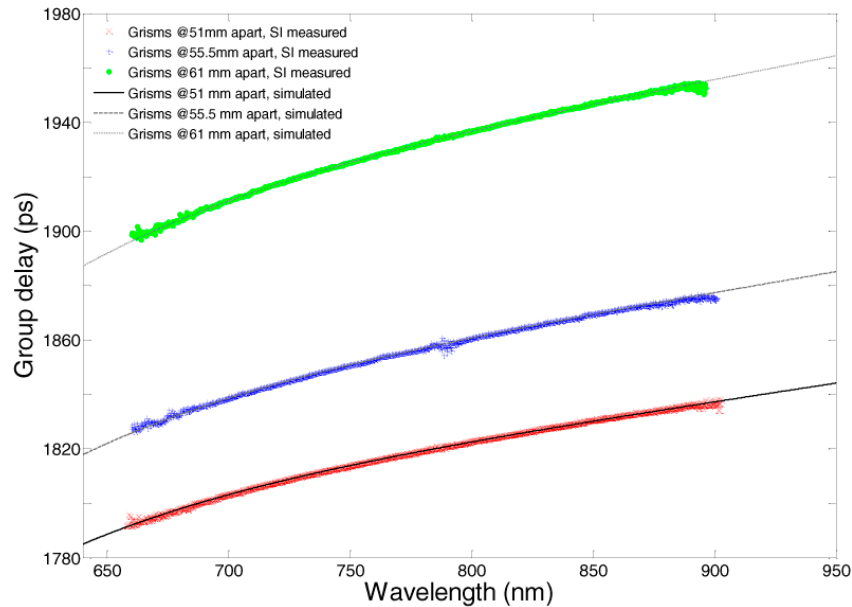


Fig. 7. Spectral interference measurement of the absolute group delay over the wavelength range 660-900 nm. Simulated curves at three different grism separations 51 mm, 55.5 mm, and 61 mm, respectively; the standard deviation associated with each corresponding data set is  $\pm 0.3576$ ,  $\pm 0.5927$ ,  $\pm 0.5074$  ps.

#### 4. Conclusion

In conclusion, we have analyzed, designed and demonstrated a near-octave spanning dispersion control system, involving a new reflection grism pair stretcher, bulk glass compressor and a Dazzler, with the grism stretcher optimally compensating the large material dispersion of the compressor materials and the latter efficiently compensates the residual spectral phase. All combined, they offer optimal delay control over the spectral range of 580 – 1020 nm. Its first implementation in a noncollinear OPCPA system, pumped for example by the different colors [9], is expected to produce gain-bandwidth-limited high-power sub-two-cycle pulses. Thinner BBO crystals can further broaden the amplification bandwidth; a Dazzler with a thinner TeO<sub>2</sub> crystal and a larger transducer bandwidth can broaden the controllable spectral range even further. This new device will allow for exploration of high-field interactions in novel parameter realm.

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