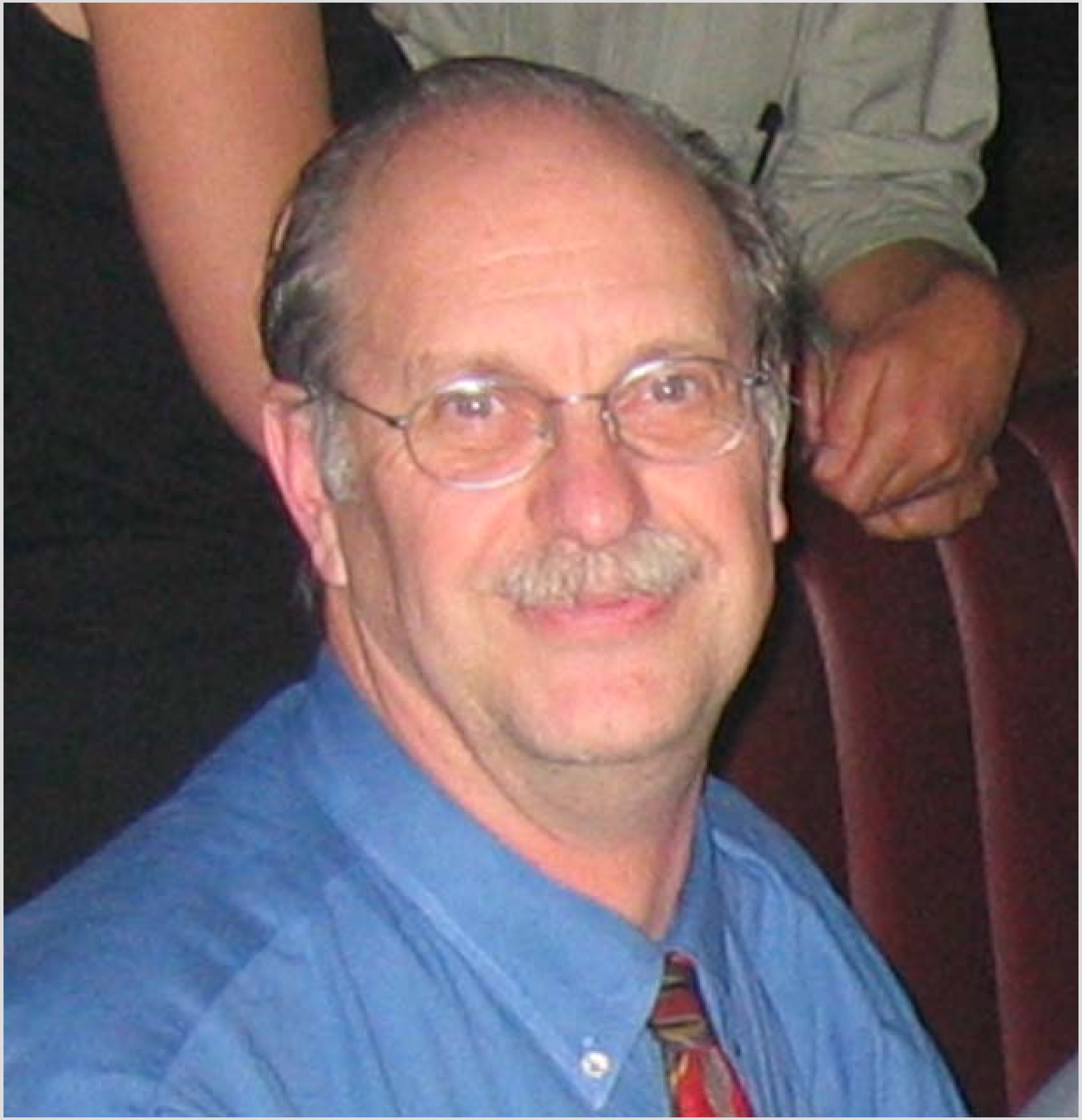

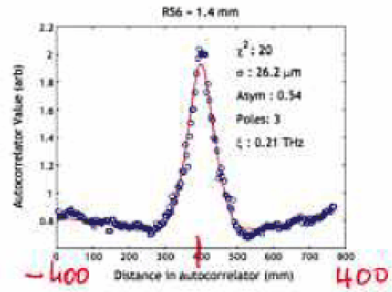

FIG. 3: Sample Autocorrelator Trace with best fit to an asymmetric Gaussian.

R_{56}	σ_z	Asym	ξ
1.4 mm	25.8 μm	0.54	0.19 THz
1.7 mm	19.6 μm	0.71	0.21 THz
2.0 mm	17.3 μm	0.74	0.27 THz
3.2 mm	13.6 μm	0.72	0.19 THz

TABLE I: Results for the main fit parameters to the four autocorrelator data runs.

frequency filter that cuts off the longest wavelength radiation from the bunch. Then there are the center position of the bunch along the horizontal axis in the autocorrelation plot and the overall pedestal of the signal, which is always expected to be similar to the Gaussian's amplitude.

As mentioned above, we implement a simple Butterworth high pass filter to model the loss of low frequencies in our apparatus. The pyroelectric detector claims flat response only out to about 1000 μm $\approx$ 0.3 THz. Best agreement has been found when we model a filter with 3 poles, but only minor variation is found by using 2 or 4 poles. The 3db point of the filter is adjusted by the fitting routine, and typically lies roughly between 0.2 and 0.3 THz, in reasonable agreement with the specifications of our detector.

An example of the fit to the above shown data is given in Figure 3, with the most important parameters of the fit listed. Table I summarizes the salient fit parameters determined for the four data runs used in the autocorrelator measurements described in this paper.

As expected, we see that the bunch length shrinks as we increase the R_{56} and therefore


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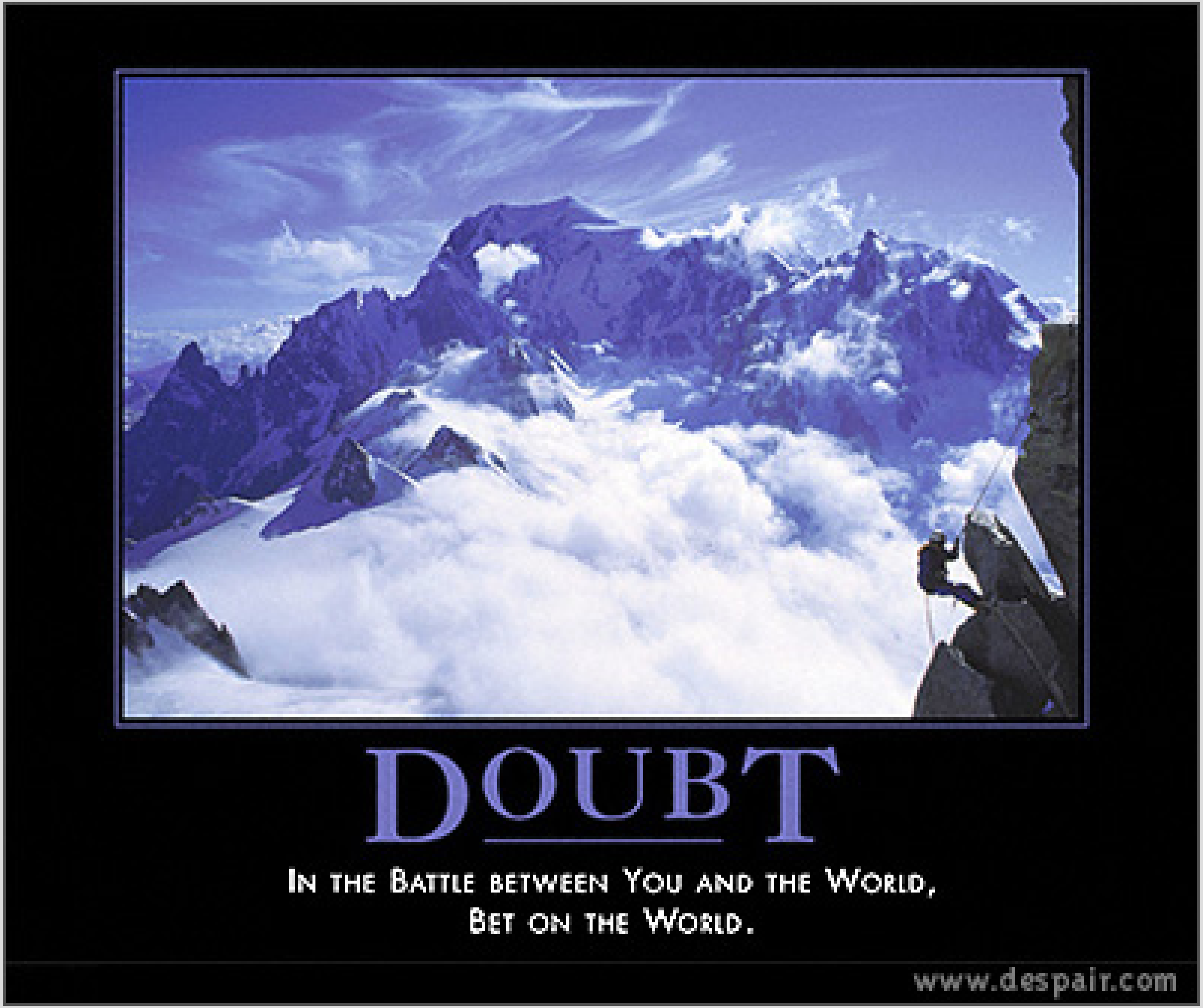
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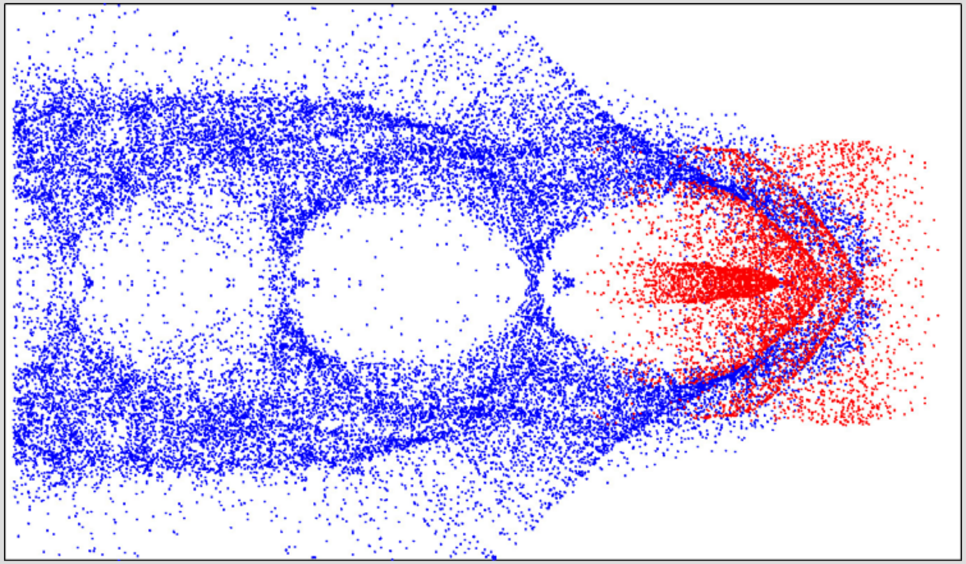

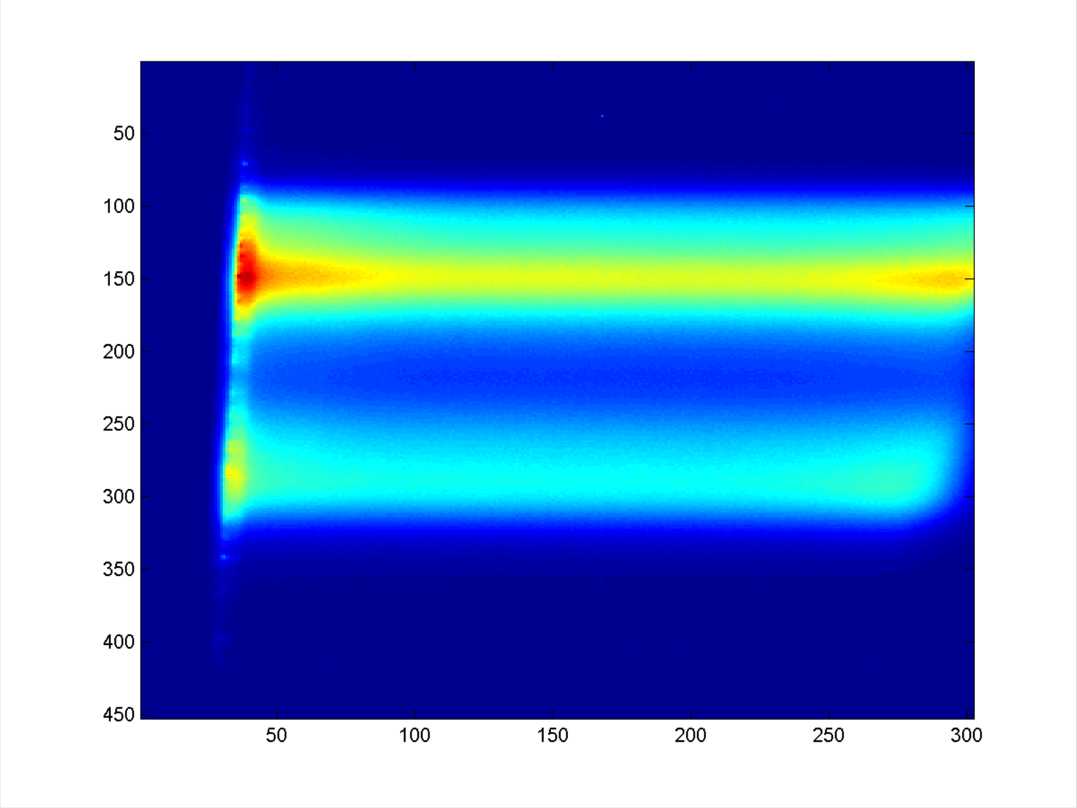

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