

Curve fit and χ^2 Analysis

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center	.4
width	.0094
amplitude	1.1

TABLE I. Student T parameters

I. MEASUREMENT

I got halfway through using a ruler with imperial units and only going down to $\frac{1}{16}$ of an inch. I got so frustrated with things going half way and a few times a quarter of the way between markings and adding fractions while keeping track of which one I measured, I started over with a metric ruler. Good choice.

I did take one bad measurement that was off by a centimeter (I did it in a GE class as advised) and caught it using the analysis which was nifty.

I estimated uncertainty of $.5mm$ on almost all measurements. This was due to parallax and not knowing where the center of each ellipse was. In one case I could not see the edge of the ellipse at all and had to interpolate. I said this one had an uncertainty of $1mm$.

Note that I had Figure 1: Set 0

II. ANALYSIS

This was a simple matter of modifying the code posted on the class site. For the Student T distribution I got $\chi^2 = 1.15$. All other were over 15. Noting that we have three degrees of freedom and 15 data points I used the table in the back of Taylor to estimate the probability of getting a $\chi^2 = 1.15$ is in the neighborhood of 30% – 35% Not bad.

I thought it was interesting that the two extreme points were dead center on the curve fit.

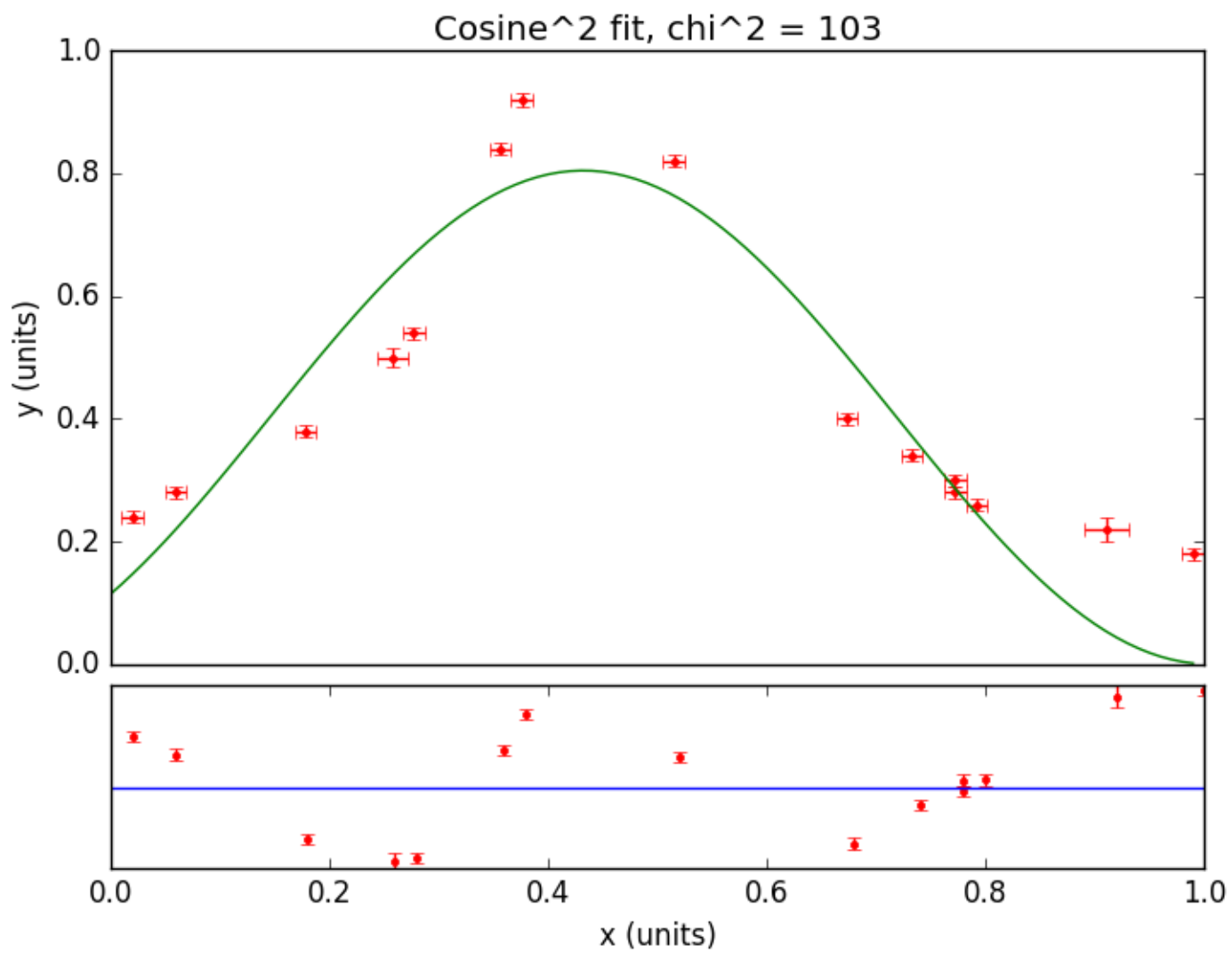


FIG. 1. Cosine² fit

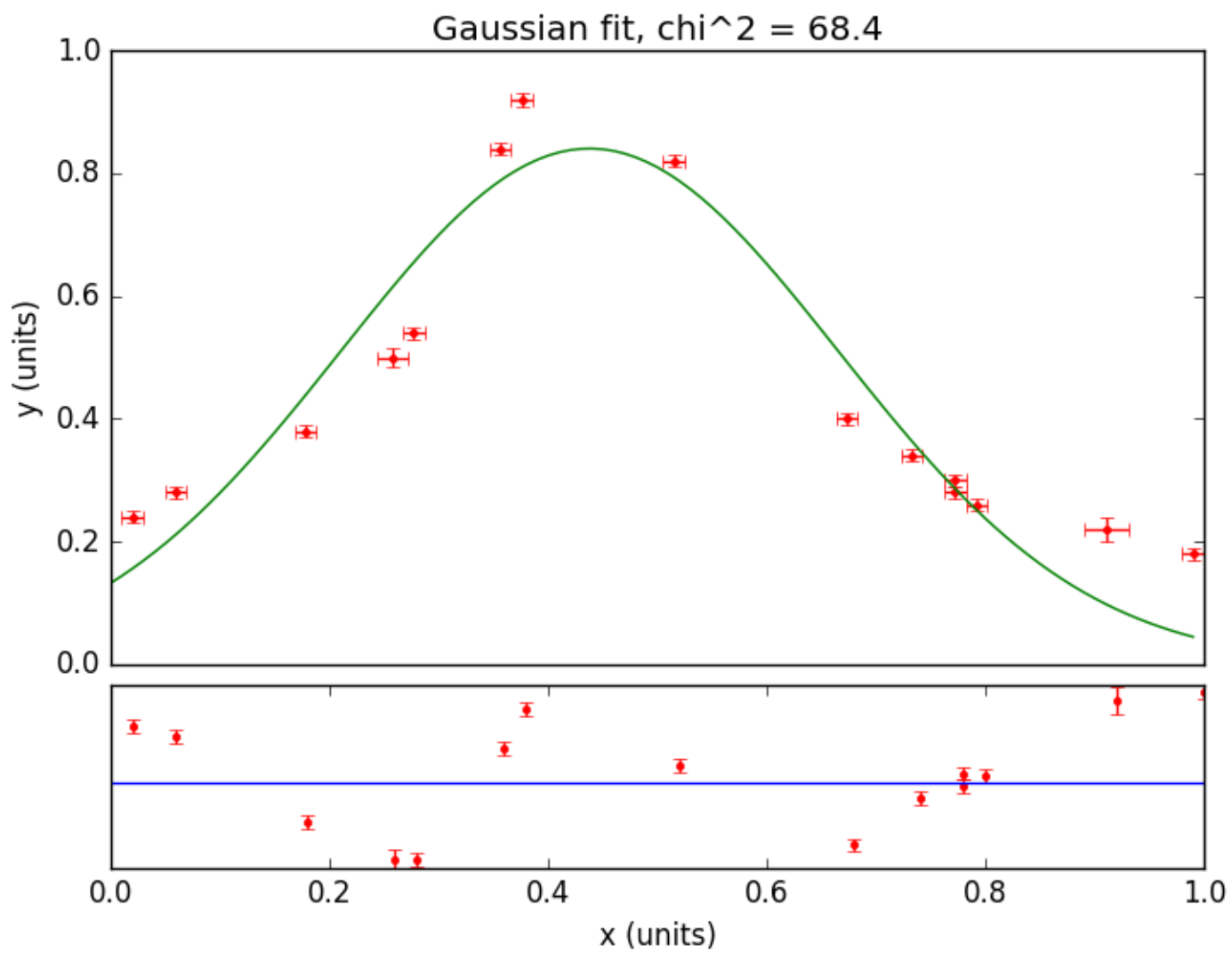


FIG. 2. Gaussian fit

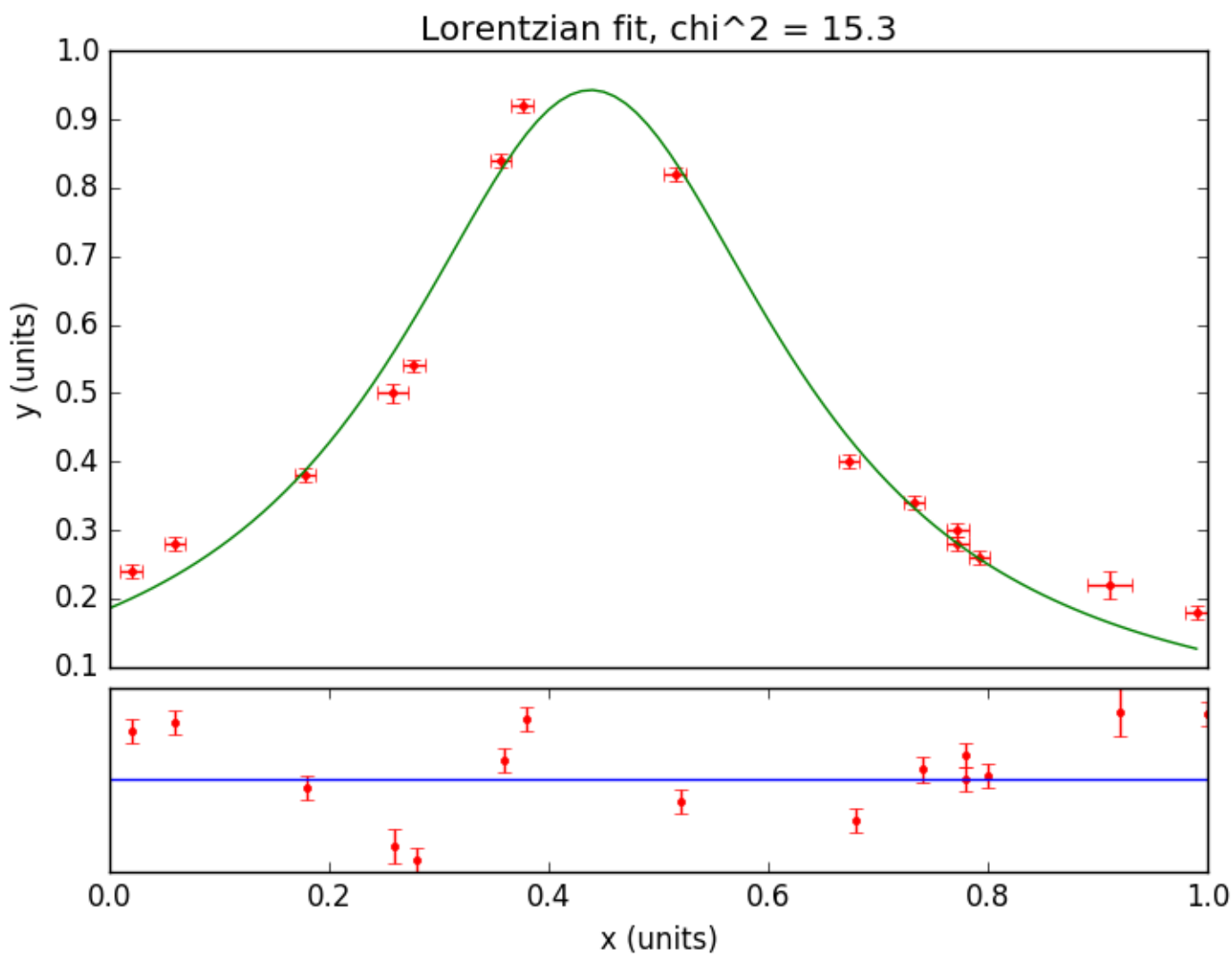


FIG. 3. Lorentzian fit

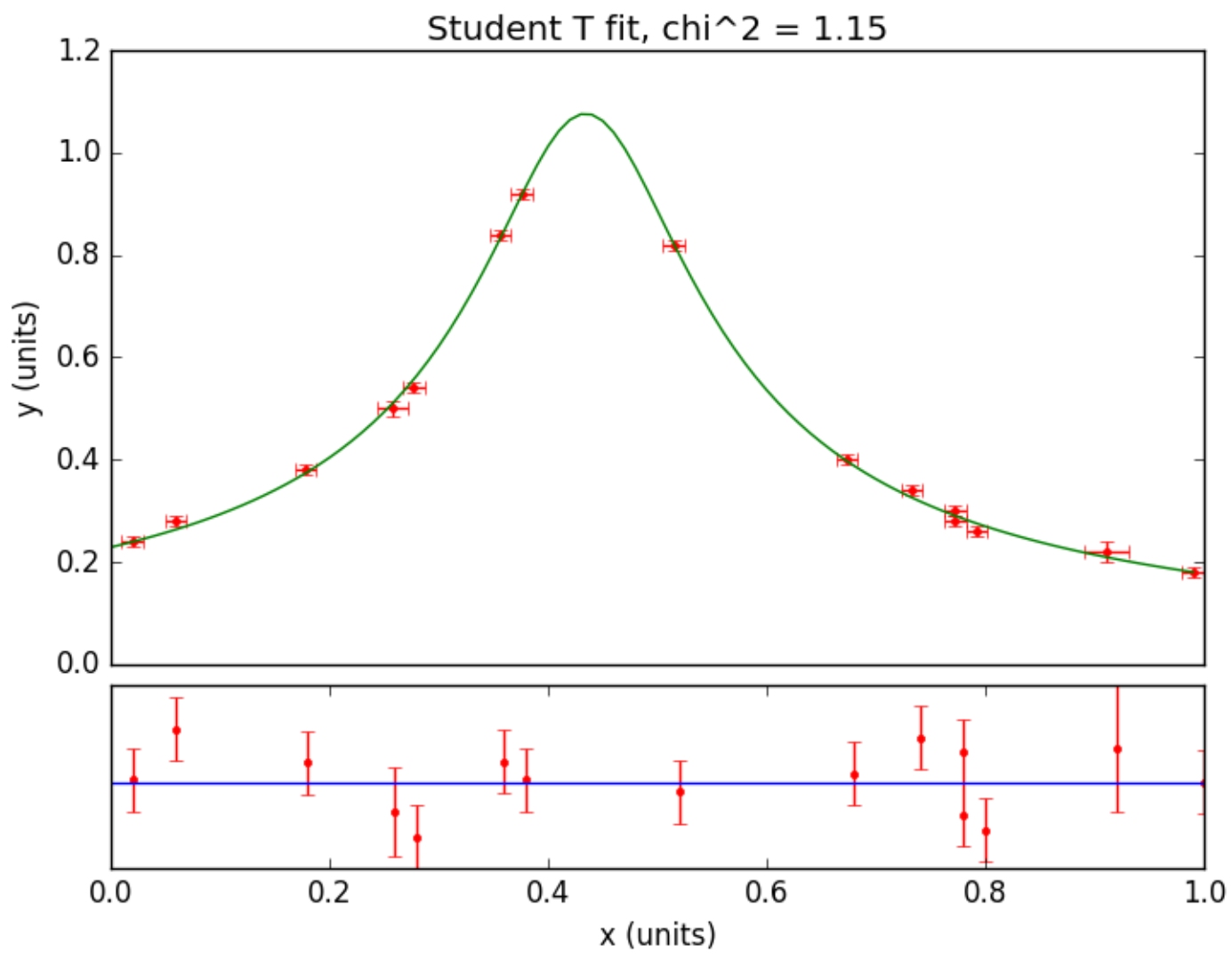


FIG. 4. Student T fit. Winner!