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To: VSRT Group  
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 Subject: Video detector characteristics

The VSRT video detector has the power characteristics shown in figure 1. This characteristic exhibits a power law that is around the ideal square law at 0 dBm but becomes greater than square at lower levels and is close to a linear voltage detector at high levels.

While the deviation from a square law results in errors in total power measurement and a degradation in signals to noise ratio (SNR) the effect on the relative signal strengths of the fringes from a 3 baseline (or more) interferometer is quite small. In figure 2 I show the variation of the SNR and fractional relative error as a function of the detector power law. The relatively small variation with power law means that the substantial change in detector power law should not seriously effect the sensitivity or the relative amplitudes of an array of 3 or more stations. The relative amplitude scale is a function of the ratio of the amplitudes among baselines. The scale error increases as the amplitude ratios increases. Figure 3 shows the scale error as a function of the amplitude ratio for a power law of 4.0. The plot of figure 2 represents an upper limit.

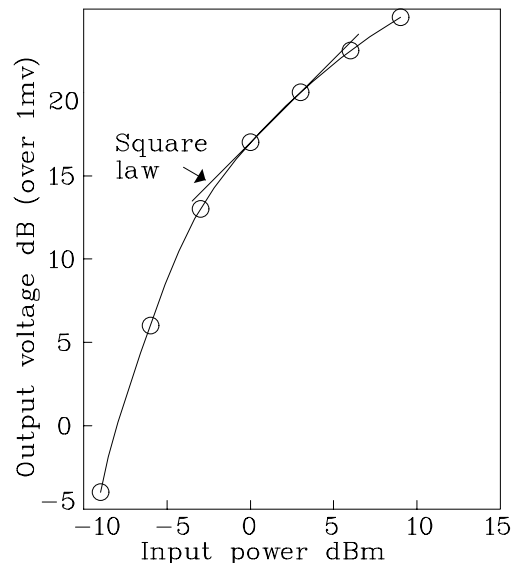


Figure 1. Power law characteristic of video detector

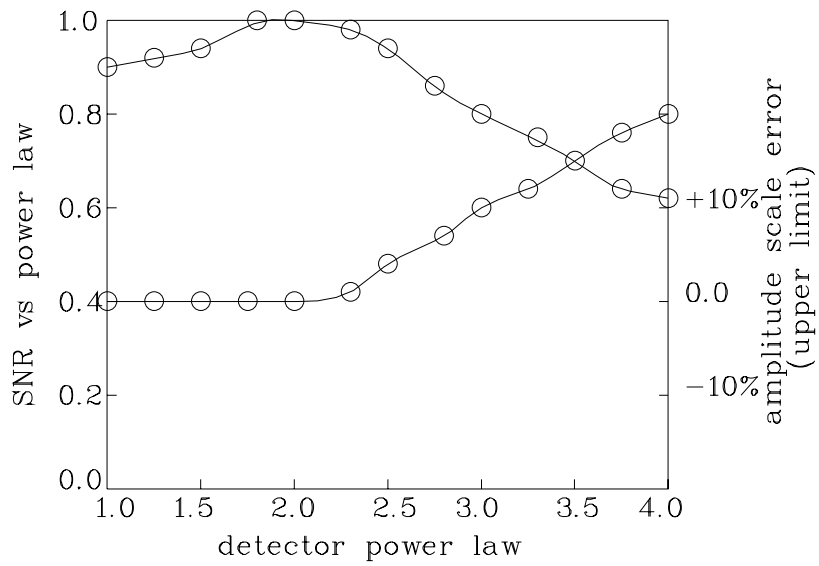


Figure 2. Variation of SNR and scale error with power law.

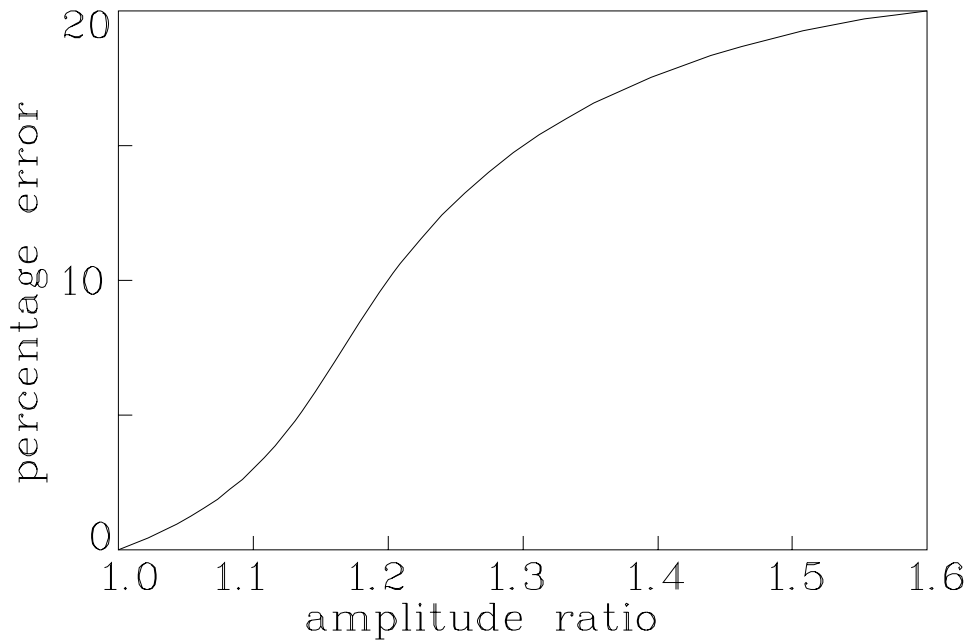


Figure 3. Relative scale error vs amplitude ratio for power law of 4