Abstract Submitted
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String breaking and the Petersburg Paradox JAKE FONTANA, PETER PALFFY-MUHORAY, Liquid Crystal Institute, KSU, LIQUID CRYSTAL INSTITUTE TEAM — The Petersburg Paradox(1) provides a simple paradigm for systems that show critical sensitivity to rare events. The breaking strength of filaments, yarns and strings is determined by the presence of defects. In a given sample, the largest defect determines the stress at which failure occurs, and since the defect distribution is a function of sample size, the breaking strength of strings depends on their length. Analogy with the Petersburg paradox suggests that the breaking strength should vary approximately linearly with the logarithm of the length. We have carried out experiments to measure the breaking strength of samples of polyester sewing thread and of monofilament fishing line ranging in length from *1mm* to *1km*. We describe our experiments, present the results, and, compare fits of our data to Weibull and mean field failure statistics and the predictions from analogy with the Petersburg Paradox. 1. I. Todhunter, *A History of Mathematical Theory of Probability*, (Chelsea, New York, 1949)

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