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Reproducible Analysis and Blindness in a Null Test of Newton's Gravitational Inverse Square Law At Sub-millimeter Scales[1] CHARLES HAGEDORN, KRISHNA VENKATESWARA, JENS GUNDLACH, University of Washington/CENPA — Proper execution of an experiment is independent of its result. Physicists who test fundamental physical law face the reality that signals for new physics receive more attention and scrutiny than null results. Yet, null results may have greater impact upon the direction of both experiment and theory. Blind experiments and result-blind review are bulwarks against systematic human bias for both experimenters and referees. I'll describe the method that made possible an irreversible public unblinding of our torsion-balance parallel-plate test of gravity at submillimeter scales in 2015. One publicly-available computer procedure generated from blind raw data the analysis, the final result, and the complete documenting thesis. The experiment included an optical "foil monitor" to constrain a systematic effect intrinsic to all short-range parallel-plate gravity experiments. I'll describe the experiment, successes, lessons learned, and result.

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