The force due to gravity reduces with the square of the distance. If you double the distance, the force is not halved but reduced to a quarter of its original value. This law, called an inverse-square law, is based purely on geometry: we live in three spatial dimensions, and therefore the inverse-square law holds. However, if the universe has more than three spatial dimensions, the inverse-square law would break.

UW physicists J. G. Lee, E. G. Adelberger, T. S. Cook, S. M. Fleischer, and B. R. Heckel have studied the gravitational $1/r^2$ law using a stationary torsion-balance detector and a rotating attractor containing test bodies with both 18-fold and 120-fold azimuthal symmetries to simultaneously test the $1/r^2$ law at two different length scales using data from detector-attractor separations between 52 $\mu$m and 3.0 mm. Newtonian gravity gave an excellent fit to the data, limiting with 95% confidence any gravitational-strength Yukawa interactions to ranges $<38.6$ $\mu$m.

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