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Measurements of the gravitational constant - why we need new ideas

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In this presentation, I will summarize measurements of the Newtonian constant of gravitation, big G, that have been carried out in the last 30 years. I will describe key techniques that were used by researchers around the world to determine G. Unfortunately, the data set is inconsistent with itself under the assumption that the gravitational constant does not vary in space or time, an assumption that has been tested by other experiments. Currently, several research groups have reported measurements with relative uncertainties below 2×10^{-5} , however, the relative difference between the smallest and largest reported number exceeds 5×10^{-4} . It is embarrassing that after over 200 years of measuring the gravitational constant, we do not have a better understanding of the numerical value of this constant. Clearly, we need new ideas to tackle this problem and now is the time to come forward with new ideas. The National Science Foundation is currently soliciting proposals for an Ideas Lab on measuring big G. In the second part of the presentation, I will introduce the Ideas Lab on big G and I am hoping to motivate the audience to think about new ideas to measure G and encourage them to apply to participate in the Ideas Lab.