IS A GRAVITON DETECTABLE?

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This talk is concerned with the question, whether it is in principle possible to detect individual gravitons. The question is not whether quantum gravity is true, but whether quantum gravity is observable. I do not claim to have answered the question. I can prove that detectors with the LIGO design, detecting gravitational waves by measuring their effects on the distance between two mirrors, cannot detect single gravitons. To reduce quantum fluctuations in the measurement of distance, the mirrors must be heavy. To make the quantum noise small enough to observe the signal from a single graviton, the mirrors must be so heavy that they collapse together into a black hole. The laws of general relativity and quantum mechanics conspire to make the measurement impossible. I examine two other kinds of graviton detector that avoid this difficulty. The question whether any of them can detect single gravitons remains open.