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Exact Solution for a Gravitational Wave Detector DMITRI RABOUNSKI, LARISSA BORISSOVA, Moscow, Russia — The experimental statement on gravitational waves proceeds from the equation for deviating geodesic lines and the equation for deviating non-geodesics. Weber's result was not based upon an exact solution to the equations, but on an approximate analysis of what could be expected: he expected that a plane weak wave of the space metric may displace two resting particles with respect to each other. In this work, exact solutions are presented for the deviation equation of both free and spring-connected particles. The solutions show that a gravitational wave may displace particles in a two-particle system only if they are in motion with respect to each other or the local space (there is no effect if they are at rest). Thus, gravitational waves produce a parametric effect on a two-particle system. According to the solutions, an altered detector construction can be proposed such that it might interact with gravitational waves: 1) a horizontally suspended cylindrical pig, whose butt-ends have basic relative oscillations induced by a laboratory source; 2) a free-mass detector where suspended mirrors have laboratory induced basic oscillations relative to each other.

Dmitri Rabounski
Moscow, Russia

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