

The Voyager Anomaly and the GEM Theory

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Abstract. For over a decade, the Pioneer Anomaly (PA) was an object of study and remains unresolved. Basically it is a sunward constant acceleration of the spacecraft that appeared unambiguously after the satellites passage beyond Saturn. It now appears possible the PA acceleration is the appearance of second, string-like, solution to the Einstein Equations first discussed in the context of charged finite mass charged particle potentials as part of the GEM theory. The exact solution to the metric equations is similar in form to the Schwartzchild Solution but with a positive sign: $g_{rr} = (1+r_G/r)^{-1}$ where r_G is a characteristic radius corresponding to the Schwartzchild radius. Adopting the approximation that for weak fields the metric becomes a Newtonian gravity potential: $g_{rr} \cong -2\phi$, a string potential form is obtained in the limit $g_{rr} \cong 1-2\phi$, for $r \ll r_G$, $g_{rr} \cong r/r_G (1-r/r_G \dots)$. For the choice $r_G = cT_H$, this produces an effective gravity acceleration $a \cong c/T_H = 8 \times 10^{-10} \text{ m/sec}^2$ in agreement with observations. The “turn on” for this potential apparently occurs with the encounter with Jupiter, which raised the spacecraft to above escape velocity. The possible physical meaning of this second metric appearance is found to be a gravitational form of Lenz’s law, where objects departing from gravity potentials experience a resistance that keeps them bound at long distances.

Keywords: General Relativity, Pioneer Anomaly, Hubble Time, Lenz’s Law

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