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Anomalous Acceleration of Pioneer 10 and 11[1]

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Coherent radio Doppler data generated by the Deep Space Network with the Pioneer 10 and 11 spacecraft show an anomalous, constant, frequency drift that can be interpreted as an acceleration directed towards the Sun of magnitude $(8.74 \pm 1.33) \times 10^{-10}$ m s^{-2} at distances between 20 and 70 AU (Anderson et al., *Phys. Rev. Lett.* **81**, 2858; Anderson et al., *Phys. Rev. D* **65**, 082004). Launched in 1972 and 1973 on the first mission to Jupiter, these two relatively simple spinning spacecraft are exceptionally useful as probes of solar-system gravitation. Although it is suspected that there is a systematic origin to the anomalous acceleration, none has been unambiguously demonstrated. The observational basis for the measurement and its error budget are reviewed. Then recent and ongoing data analysis is discussed, including earlier data for both spacecraft, and some sparse later data generated for Pioneer 10 between July 1998 and March 2006 at distances between 70 and 90 AU.

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