# Outer Planet Magnetospheres

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Magnetospheres of the outer planets range from the giant magnetosphere of Jupiter to the mini-magnetosphere of Ganymede. This paper will present a brief comparison of the magnetospheres of the outer planets and summarize our understanding of their structures, plasma sources and dynamics.

Table 1: Properties of the Solar Wind and Scales of Outer Planetary Magnetospheres

| | Jupiter | Saturn | Uranus | Neptune | Pluto |
|---|---|---|---|---|---|
| Distance, $a_{planet}$ (A.U.) [a] | 5.2 | 9.5 | 19 | 30 | 30-50 |
| Solar Wind Density [b] (amu cm$^{-3}$) | 0.3 | 0.1 | 0.02 | 0.008 | 0.008-0.003 |
| Radius, $R_{Planet}$ (km) | 71,398 | 60,330 | 25,559 | 24,764 | 1,170 (±33) |
| Surface Magnetic Field $B_O$ (Gauss = $10^{-4}$ T) | 4.28 | 0.22 | 0.23 | 0.14 | ? |
| $R_{MP}$ [c] (planetary radii) | 42 $R_J$ | 19 $R_S$ | 25 $R_U$ | 24 $R_N$ | |
| Observed Size of Magnetosphere (km) | 50-100$R_J$ $7 \times 10^6$ | 16-22$R_S$ $1 \times 10^6$ | 18 $R_U$ $5 \times 10^5$ | 23-26 $R_N$ $6 \times 10^5$ | |

a. 1 A.U. = 1.5 x 10$^8$km

b. Solar wind density fluctuates by ~5 about typical values of $\rho sw$ ~[(8 amu cm$^{-3}$) / $a^2$ planet ]

c. $^R MP$ is calculated using $^R MP = (Bo^2/2\mu_o\rho u^2)^{1/6}$ with of $\rho_{sw}$ given above and $u$~400km s$^{-1}$.