$$K \rho_{SW} V_{SW}^2 = \frac{B_{MS}^2}{2\mu_0}$$

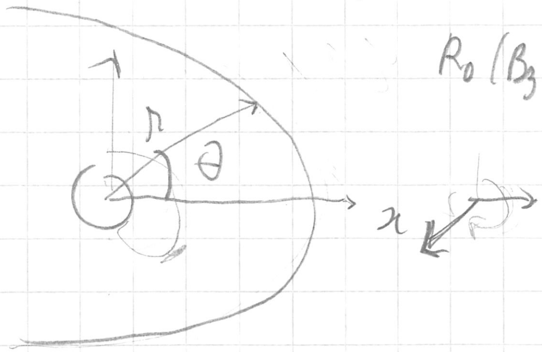
$K = 0.9$ at Earth

Shue et al. (1998) model

$$r(\theta) = R_0 \left(\frac{2}{1+\cos\theta}\right)^{\alpha}$$

$\alpha(B_z, D_p)$

$R_0(B_z, D_p)$



line dipole so that $B = B_{MS}$ at $x = 10 R_e$ or $8 R_e$?

$$B_z = B = D \frac{z^2 - x^2}{r^4} \qquad z = 0 \quad x = 8 R_e$$

$$B = -\frac{D}{x^2} \Rightarrow D = -Bx^2 = -\sqrt{2\mu_0 K \rho_{SW}}\, V_{SW} (8 R_e)^2$$

$\rho_{SW} = 6\ cm^{-3}$ $\quad V_{SW} = 500$ km/s

cone angle $25°$ or $155°$

$D = 1.6e^8$ before the IP shock in AEF

	before IP shock	after IP shock $T = 100$ kK	$T = 500$ kK
ρ_{SW}	$4\ cm^{-3}$	$9.43\ cm^{-3}$	$7.7\ cm^{-3}$
V_{SW}	450 km/s	594 km/s	594 km/s
B	5 nT		
B_z		-7.89 nT	-5.36 nT
R_{MP} (Shue)		$8.87\ R_e$	$8.61\ R_e$
			$D = 3.06\ 10^8$
		$\rightarrow D$	$\rightarrow D/D_0 = 2.42$

$$D = -\sqrt{2\mu_0 \underset{0.9}{K} \underset{9.43 cm^{-3}}{\rho_{SW}}}\ \underset{594 km/s}{V_{SW}} (8.87 R_e)^2$$

$$= -\sqrt{2 \times 4\pi\, 10^{-7} \times 0.9 \times 9.43\, 10^6}\ 594.10^3 . (8.87 \times 6371 \times 10^3)^2$$

$$\approx \boxed{3.59\ 10^8}$$