$\frac{1}{1000000}$

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- $H_2$
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$\delta_{max} = \frac{4mM}{(m+M)^2}\delta_{max} = \frac{4m}{M} \ll 1\delta_{max} \sim 1$

$EP = Eeuumu_eEmu_eP = \frac{e^2E^2}{m_e\nu_m}\nu_m$
$= 1.5\delta e(T_e - T_gas)$

$$T_e - T_{gas} = \frac{2eE^2}{3\delta m_e\nu_m^2}$$

$1/p^21mbar$
$delta_{max} \sim 1 \ll 1$
$2eVT_e \gg T_{gas}$

$cmmbar$

$i_0 = \dot{N}_0e1 - \exp(-t)10pA10V$

$d\dot{N} = \dot{N}\alpha dxi = i_0\exp(\alpha d)$
$x$
$I - V1 - \exp(-t)$
$\gamma 0.01$

$i_0(\exp(\alpha d) - 1)\gamma$
$i = i_0\frac{\exp(\alpha d)}{1-\gamma(\exp(\alpha d)-1)}$

$$1 - \gamma(\exp(\alpha d) - 1) = 0$$

$\gamma \exp(\alpha d) = \gamma + 1$

$$\gamma \exp(\alpha d) = 1 + \gamma$$

$\alpha\lambda = 1/\lambda$
$\varepsilon_i \exp($
$\lambda$

$$\alpha = Ap \exp(-Bp/E)$$

$E = V/d$

$$V_B = \frac{Bpd}{\ln Apd - \ln \ln 1 + 1/\gamma}$$

$C = A/\ln 1 + 1/\gamma$
$pdV_B \ln Cpd = 1$
$\alpha\gamma$

$eE\lambda$
$V_B$

$$\frac{dn_j}{dt} + \boldsymbol{\nabla} \cdot \boldsymbol{\Gamma}_\mathbf{j} = S_j$$

$S_j \Gamma_j - D_j \boldsymbol{\nabla} n_j n_j u_j = \pm n_j \mu_j E$
$S_j = n_e \alpha u_e$
$-\gamma_{second}$
$1mm100mm$

$$\Gamma_e \gg \Gamma_i$$

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- $\lambda_D$
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- $\rightarrow$

$V_{plasma}V = 0V_{plasma} - 0 = \Delta V_{presheath}u_s$

$0.5Mu^2 + eV = 0.5Mu_s^2$

$n_i u = n_s u_s$

$un_i = n_s(1 - \frac{2eV}{Mu_s^2})^{-0.5}$

$n_0 = n_e = n_i$

$n_e = n_i n_s$

$n_i > n_e$

$n_e = n_s \exp(V/T_e)$

$$\frac{d^2V}{dx^2} = -(n_i - n_e)e/\epsilon_0$$

$$\frac{d^2V}{dx^2} = \frac{en_s}{\epsilon_0}\Big(\frac{1}{T_e} - \frac{e}{Mu_s^2}\Big)$$

$\Big(\frac{1}{T_e} - \frac{e}{Mu_s^2}\Big) > 0$

$$u_s \geq u_B = \sqrt{\frac{eT_e}{M}}$$

$0.5Mu_B^2 T_e/2$

$0.61n_0 u_B$

$\sim 5.2T_e$