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HYM Code Normalizations

Physical Quantity	*Variable*	*Normalization (Gaussian)*	*SI Equivalent*
Density	n	n_0	n_0
Magnetic Field	$\mathbf{B}$	B_0	B_0
Time	t	$t_0 = 1/\omega_{ci0} = m_i c/Z_i e B_0$	$m_i/Z_i e B_0$
Pressure	p	$p_0 = B_0^2/4\pi$	B_0^2/μ_0
Velocity	$\mathbf{v}$	$v_{A0} = B_0/\sqrt{4\pi m_i n_0}$	$B_0/\sqrt{\mu_0 m_i n_0}$
Length	$\mathbf{r}$	$L_0 = v_{A0}/\omega_{ci0} = c/\omega_{pi0} = \sqrt{m_i c^2/4\pi n_0 Z_i^2 e^2}$	$\sqrt{m_i/\mu_0 n_0 Z_i^2 e^2}$
Current Density	$\mathbf{J}$	$B_0\, c/4\pi L_0$	$B_0/\mu_0 L_0$
Poloidal Flux	ψ	$B_0 L_0^2$	$B_0 L_0^2$
Temperature	T	$p_0/n_0 = m_i v_{A0}^2 = B_0^2/4\pi n_0$	$B_0^2/\mu_0 n_0$
Energy Density	ε	$B_0^2/8\pi$	$B_0^2/2\mu_0$
Viscosity	μ	$p_0\, t_{A0} = B_0^2 R_c/4\pi v_{A0} = R_c v_{A0} m_i n_0$	$R_c v_{A0} m_i n_0$
Resistivity	η	$4\pi\, t_{A0}\, v_{A0}^2/c^2 = 4\pi\, R_c\, v_{A0}/c^2$	$\mu_0 R_c v_{A0}$

Additional Simulation Parameters

Parameter	*Variable*	*SSX Value (SI)*	*SSX Value (HYM)*
Device Radius	R_c	0.203 m	28.19 v_{A0}/ω_{ci0}
Device Length	L_c	0.305 m	42.36 v_{A0}/ω_{ci0}
Alfvén Time	$t_{A0} = R_c/v_{A0}$	2.94 μs	28.19 $1/\omega_{ci0}$