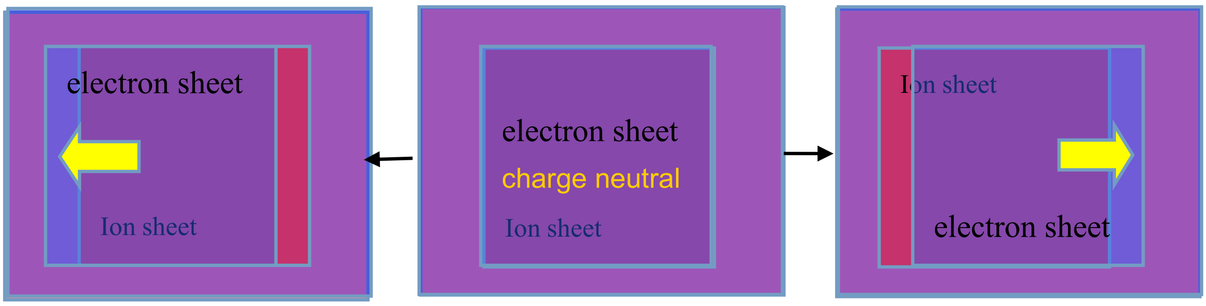
Charge Alternating by Plasma Oscillation Resonance. 2016/6/15,16,20,21,22,24.

Electron Charge Density $N_e(x,y,z)$ is increasing function of height =z till ion sphere summit. Usually,$N_e(x)$ are overlapped with ion density $N_i(x)$as charge neutral law($0=N_i(x)-N_e(x)$). By making light mass electrons shifts by $x\pm\delta x$,then $\pm\delta x N_e(x)<0,>0$.Such charge emerging (with kinetic inertia) act to recover charge neutral state.This become **plasma oscillation=** ω_P**.** If irradiating such **density layer** by same frequency $\omega=\omega_P$,from ground beam radiator, **the resonance** can generate alternate **charge density wave(CDW)**toward ground**.** However.this horizontal modulation(x,y) could not be large CDW antenna.While,vertical modulation(z) could be large CDW antenna(HAARP?!!!).

[1] : *Plasma Lecture Notes.*
http://www.pp.teen.setsunan.ac.jp/lecture/#lec12



electron left shift <this is a accordion model,but not harp> electron right shift

Left figs are **very simplified Plasma Self Oscillation MODEL**..x is horizontal position(also **displacement**)variable of electrons.Heavy weight ion(red sheet)is not movable by electric intensity $=$**E**.While light weight electrons is to shift left and right by **E**.Note $\oiint$**dSD**$=$Q is *Gauss's law* for volume charge$=$Q. n_0 is electron volume density. S is perpendicular surface area of sheet.

Plasma Self Oscillation.<m_e=electron mass>

$E=Q/\varepsilon S=en_0xS/\varepsilon S=en_0x/\varepsilon$.

$m_e(d^2x/dt^2)=Ee=-e^2n_0x/\varepsilon$.

$X(t)=A\cos(\omega_P t)$. $\omega_P=\sqrt{(e^2n_0/m_e\varepsilon)}$.

$m_e(d^2x/dt^2)=-eE_0\cos(\omega t)-e^2n_0x/\varepsilon$.

EM wave excitation.

A$=(eE_0/m_e)/(\omega^2-\omega_P^2)$.

E$=E_0\cos(\omega t)\omega^2/(\omega^2-\omega_P^2)$.

☞: $\omega=\omega_P$ is strong resonance between plasma and EM wave.Then note charge term e^2n_0x/ε is also strong resonance.This could be alternate charge density wave source= ρ toward ground !!!. → □$\phi=-\rho/\varepsilon$.

[２]：Full Set(?) Dynamic Equation of Electron in Ion Sphere. 2016/6/15,16,17

Here is the kernel of **CDW generating mechanism** in **electron resonance dynamics(ERD)** in ion sphere by input of exterior EM wave from ground(HAARP).Collaboration by input EM and **plasma oscillation** is to generate stronger CDW toward ground.Note ERD equation at here neglects **relativity theory** and reaction force of radiation*.We assume **E** is horizontal(x axis,while **B** is y axis, of which force is perpendicular with x axis..So we neglect magnetic B for **the simplicity**(see APPENDIX6).

*Nunzio Tralli,Classical Electromagnetic Theory(McGraw-Hill),P275,1963

(0)heavy mass ions never move,but electrons voscillate. <displacement$=\delta x\equiv x$>。

＊$m_e(d^2x/dt^2)=-m_e(dx/dt)\cdot N_e\sigma_I|(dx/dt|-(e^2N_e/\varepsilon)x-eE_0\exp j(\omega t)$............ERD.

☞：Note this is **non relativistic equation** which allows velocity$=\omega A>c_0$. See (6).

$|(dx/dt|(dx/dt)$ becomes **energy loss term** attenuating input EM Wave.

$P_L=\mathbf{f.V}=m_e(dx/dt)\cdot N_e\sigma_I|(dx/dt)|$.

(1)E_ρ:Electric Intensity caused by charge distribution ρ in medium of ε(1dim model).

□$E=\mathrm{grad}\rho/\varepsilon$. → $\partial^2E_x/\partial x^2=(\partial\rho/\partial x)/\varepsilon$. → $E_x=\varepsilon^{-1}\int_0^x du\rho(u)$.→ $E_x=x\langle\rho\rangle/\varepsilon$.*<average>

(2)$\mathbf{F}_C=f_c m\mathbf{v}$.:momentum absorption force(by averaging)on random collision with ions.

Definition on *average mean path length*：$\lambda N\sigma\equiv1.\rightarrow f_c\equiv V/\lambda=VN\sigma$.

$f_c=|dx/dt|N_e\sigma_I$. N_e=ion density=electron density, =cross section of ion(Nitrogen),

☞：Our assumption neglect y axis trajectory due to magnetic field B,so f_c must be multiply by factor α≡(full path length/sec)/V～2?.This could be accomplished by $\sigma_I\rightarrow\alpha\sigma_I$

＊(3)$(d^2x/dt^2)=-(N_e\sigma_I|dx/dt|)(dx/dt)-(e^2N_e/m_e\varepsilon)x-(e/m_e)E_0\exp j(\omega t)$.

This is a non linear equation,so we must take something approximation method. Author assume something constant $K\equiv|dx/dt|$ in average meaning of periodic solution toward final adjust. Then the equation shall become linear one with $x=A.\exp j(\omega t)$.

$-A\omega^2=-i(N_e\sigma_IK)\omega A-(e^2N_e/m_e\varepsilon)A-(e/m_e)E_0$.

$A[-\omega^2+i(N_e\sigma_I)\omega K+(e^2N_e/m_e\varepsilon)]=-(e/m_e)E_0$.

$A=-E_0(e/m_e)/[(e^2N_e/m_e\varepsilon)-\omega^2+i(N_e\sigma_I)\omega K]$. Note A is complex,but not real.

(4)$|A|=E_0(e/m_e)/\sqrt{[(\omega_P^2-\omega^2)^2+(N_e\sigma_I)^2\omega^2K^2]}$. <＊$\omega_P^2\equiv(e^2N_e/m_e\varepsilon_0)$.>

$e=1.61\times10^{-19}$, $m_e=9.1\times10^{-31}$, $\sigma_I=\sigma_N=\pi(65\text{x}10\text{-}^{12}\text{m})^2=1.3\text{x}10^{-20}\text{m}^2$,

$N_e=10^{12}/\text{m}^3$.(E layer)；$(N_e\sigma_I)=1.3\text{x}10^{-8}$. $(e/m_e)E_0=1.76\text{x}10^{11}E_0$. ε_0=8.85x10-12F/m

(5)$f_P=\sqrt{(e^2N_e/m_e\varepsilon_0)}/2\pi=8.97\sqrt{N_e}$.

(6)$K \equiv \langle |dx/dt| \rangle = \langle |j\omega A \exp j(\omega t)| \rangle = (2/\pi)\omega|A|$. <The average velocity for collisions>.

(7)$|A| = E_0(e/m_e)/\sqrt{[(\omega_P^2 - \omega^2)^2 + (2/\pi)^2(N_e\sigma_I)^2\omega^4|A|^2]}$

$|A|^2[(\omega_P^2 - \omega^2)^2 + (2/\pi)^2(N_e\sigma_I)^2\omega^4|A|^2] = (E_0e/m_e)^2$.

＊＊＊$(2/\pi)^2(N_e\sigma_I)^2\omega^4|A|^4 + |A|^2(\omega_P^2 - \omega^2)^2 - (E_0e/m_e)^2 = 0$.

$|A|^2 = \{-(\omega_P^2 - \omega^2)^2 + \sqrt{[(\omega_P^2 - \omega^2)^4 + 4(E_0e/m_e)^2(2/\pi)^2(N_e\sigma_I)^2\omega^4]}\}/2(2/\pi)^2(N_e\sigma_I)^2\omega^4$.

$4(E_0e/m_e)^2(2/\pi)^2(N_e\sigma_I)^2 = (8/\pi^2)\sigma_I^2(\varepsilon_0^2E_0^2/e^2)(e^2N_e/m_e\varepsilon_0)^2 = (8/\pi^2)\sigma_I^2(\varepsilon_0E_0/e)^2\omega_P^4$.

(8)Amplitude Solution.

$|A|^2 = \{-(\omega_P^2 - \omega^2)^2 + \sqrt{[(\omega_P^2 - \omega^2)^4 + (8/\pi^2)\sigma_I^2(\varepsilon_0E_0/e)^2\omega_P^4\omega^4]}\}/(8/\pi^2)(N_e\sigma_I)^2\omega^4$.

(9)**Resonance Amplitude**<＊ $\omega_P^2 = (e^2N_e/m_e\varepsilon_0)$>.

$|A(\omega = \omega_P)|^2 = \sqrt{[(8/\pi^2)\sigma_I^2(\varepsilon_0E_0/e)^2\omega_P^4\omega^4]}/(8/\pi^2)(N_e\sigma_I)^2\omega^4$

$= \sqrt{[(1/8)\pi^2(\varepsilon_0E_0/e)^2\omega_P^4\omega^4]}/N_e^2\omega^4\sigma_I$.

$|A(\omega = \omega_P)| = (1/8)^{1/4}\cdot\pi(\varepsilon_0E_0/e)\omega_P^2\omega^2/N_e\omega^2\sqrt{\sigma_I} = (1/8)^{1/4}\cdot\pi(\varepsilon_0/e)\omega_P^2E_0/N_e\sqrt{\sigma_I}$

$= \sqrt{\sqrt{(1/8)}}\pi(\varepsilon_0/e)(e^2N_e/m_e\varepsilon_0)E_0/N_e\sqrt{\sigma_I} = \sqrt{\sqrt{(1/8)}}\pi(e/m_e)E_0/\sqrt{\sigma_I}$.

＊$|A(\omega = \omega_P)| = (1/8)^{1/4}\cdot\pi(e/m_e)E_0/\sqrt{\sigma_I}$.

example calculation) <$N_e = 10^{12}/m^3$.→ $f_P = 9\sqrt{N_e} = 9MHz$>

$e = 1.6x10^{-19}C.$; $m_e = 9.1 \times 10^{-31}$, $\sigma_N = \pi(65x10^{-12}m)^2 = 1.3x10^{-20}m^2$,

＊$G \equiv |A(\omega = \omega_P)|/E_0 = \sqrt{\sqrt{(1/8)}}\pi(e/m_e)/\sqrt{\sigma_I}$.

$= 3.3x10^{11}/1.14x10^{-10} = 2.9x10^{21}m^2/volt$ too large gain?!<note A is displacement in length>

example)**Correction by Relativity Theory**.

$E_0 = 1volt/m, |A(\omega = \omega_P)| = 2.9x10^{21}m$. $V = 2.9x10^{21}m/(1/f_P) = 2.6x10^{28}$ ~~$3x10^8m/s$~~.

Yes!,upper limit of A, $x = \lambda/2 = 16.7m(f_P = 9MHz)$. G is not correct.

Note:$e(eN_e/\varepsilon)x \equiv eE_N$.→ $\varepsilon E_N = D_N = (eN_e)x = (eN_e)GE_0$。 ← **Charge Alternater !!**

Electric flux D_N is alternate surface charge density which can re-radiate charge density wave

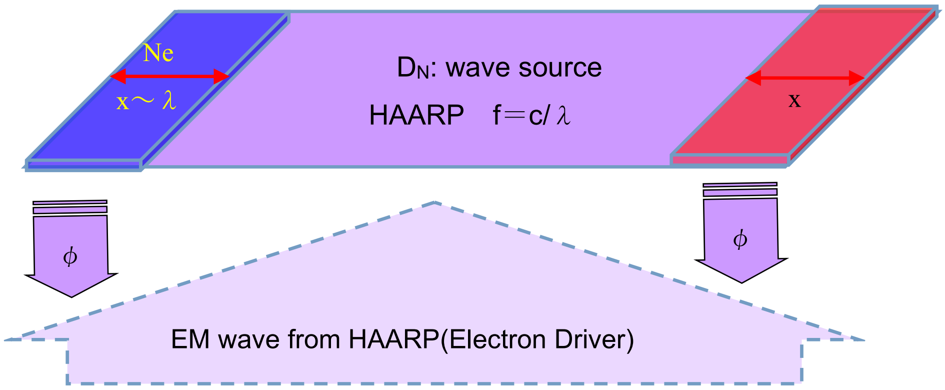
$= \phi$ toward ground !

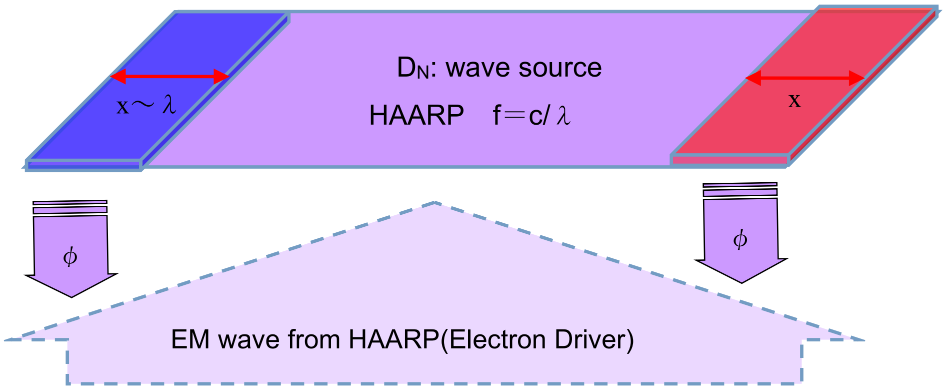
→ $\Box\phi = 0$; ← $\phi = \oiint d\mathbf{S}.\mathbf{D}/4\pi\varepsilon R$.

Conclusion:

Velocity of stretching A is to be over that of light,so we should assume max $A = \lambda/2$ in case of resonance at $\omega = \omega_P$.Otherwise,$A < \lambda/2$.

⑽**The Horizontal Charge Density Wave Radiators in Ion Sphere.**



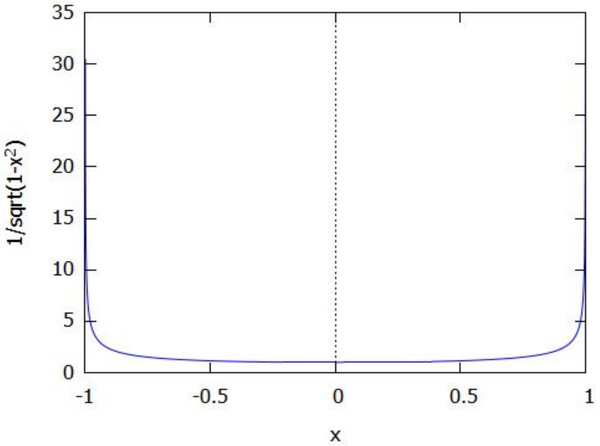


This method could not realize large area CDW antenna,so could not be HAARP.

x＝Asin(ωt),t＝asin(x/A)/ω.→x＝－ωAcos(ωt)dt.

dt/dx＝－1/ωAcos(ωt)＝－1/ωAcos(asin(x/A))........ **Amplitude Density Function**

plot2d(1/cos(asin(x)),[x,-1,1]);



APPENDIX1:

N_e	$f_P = 9\sqrt{N_e}$	$\lambda_P/2$	$G \equiv N_e \lambda_P/2$
$10^{10}/cm^3$.	0.9MHz	333m	$3.3x10^{12}/cm^2$.
$10^{11}/cm^3$.	2.8MHz	52.3m	$5.2x10^{12}/cm^2$.
$10^{12}/cm^3$.	9MHz	16.7m	$1.6x10^{13}/cm^2$.
$10^{13}/cm^3$.	28mHz	5.2m	$5.2x10^{13}/cm^2$.

APPENDIX2:

|(dx/dt|(dx/dt) becomes **energy loss term** attenuating input EM Wave in (1).

Following are energy per 1 electron,so energy volume density must multiply Ne.

$P_L = \mathbf{f.V} = N_e \sigma_I m_e |(dx/dt|(dx/dt)^2$.

$N_e \sigma_I m_e |(dx/dt|(dx/dt)^2 = 10^{12}x10^{12}x3x10\text{-}^{20}x9.1x10^{-31}xA^3/2$

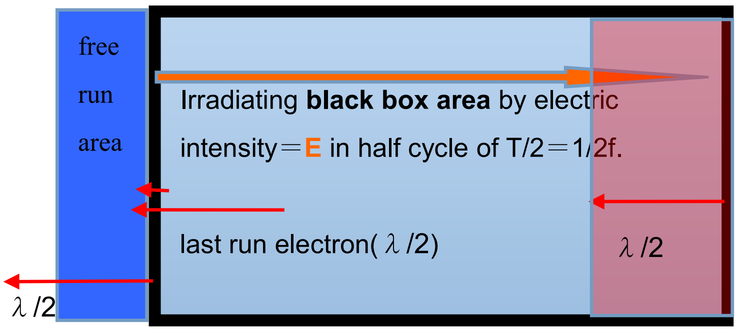
$\sim 10^{12}x10^{12}x3x10^{-20}x9.1x10^{-31}x \lambda^3/8$.

This is very small ?,

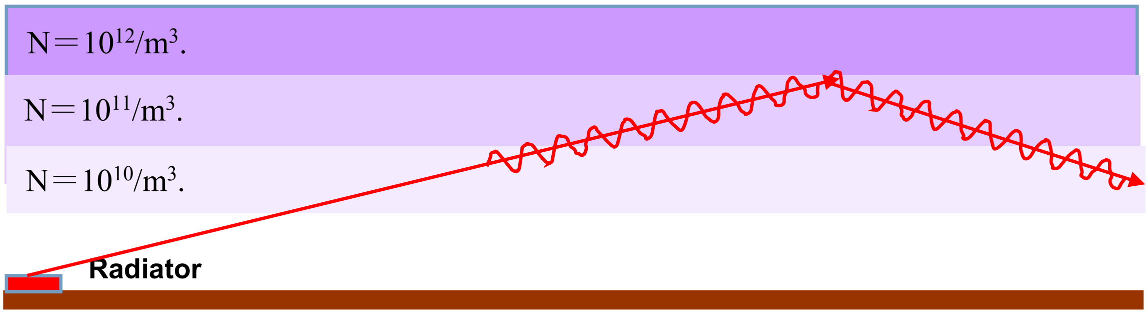
＊ $\sigma_I = \sigma_N = \pi (65x10\text{-}^{12}m)^2 = 1.3x10\text{-}^{20}m^2$, $N_e = 10^{12}/m^3$(E layer) ,$m_e = 9.1x10^{-31}$Kg

$|(dx/dt|(dx/dt)^2 = (2/\pi)AxA^2/2$. $A \sim \lambda/2$.

APPENDIX3:Un-symmetry of electron flap and ion flap.



APPENDIX4:Vertical Modulation on Ion Sphere.



Vertical Modulation by Confronting Dual Electric Intensity ±E.

(1)Incident alternate EM wave irradiating ion sphere is

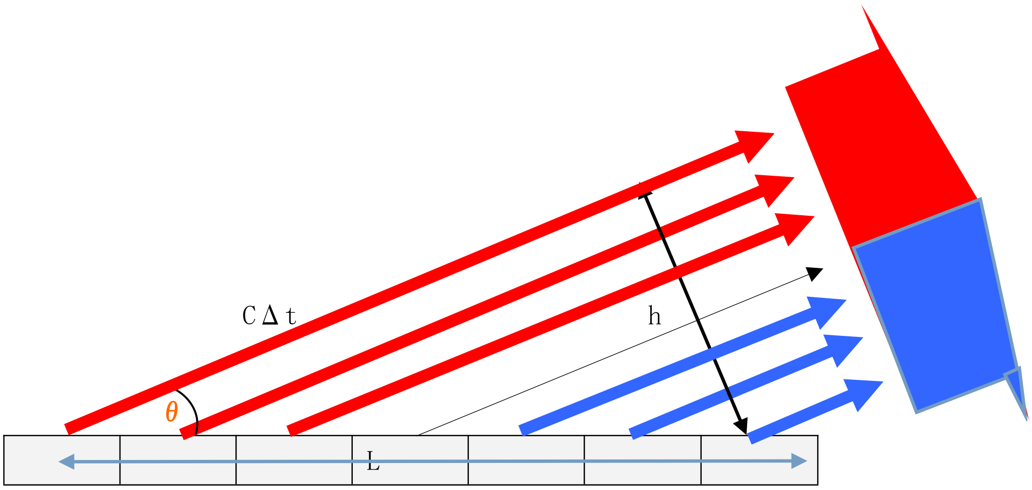
(a)Beamed plane wave with finite area of L×L,where $L=n\lambda$ (n>10?).

(b) $\lambda=c/f$: wave length.

(c)Electric field＝**E** is vertical。

(d)Phased array radiator.

Beamed wave is enough exact to modulate ion sphere field.



±E Dual Finite Plane Wave.

$E_x(x;t)=E_y(x;t)=0$

$E_z(x;t)=E(z)\exp(kx-\omega t)$

$E_z(z>0)\fallingdotseq +E_0$.　$E_z(z<0)\fallingdotseq -E_0$.

$\Box\mathbf{E}(\mathbf{r};t)=0$.　　　$*\Box=\nabla^2-\partial^2/c^2\partial t^2$。

$\Box\mathbf{A}=0$.　←　$\mathbf{A}=\oint\langle d\mathbf{S}\times\mathrm{curl}\,\mathbf{A}(\mathbf{r}';t-R/c)\rangle/4\pi|\mathbf{r}-\mathbf{r}'|$

$=\oint\langle d\mathbf{S}\times\mathbf{B}(\mathbf{r}';t-R/c)\rangle/4\pi|\mathbf{r}-\mathbf{r}'|$.

⑵W Radiator with distance＝(n+1/2)λ(n=1,2,3,..) is equivalent to nothing.<k＝2π/λ>

Radiation cancellation at far points is to occure by wave source configuration.This fact become important in synthesizing CDW radiator in ion sphere.

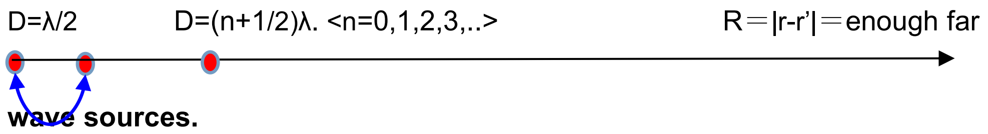
☞:note following discussion are same phase at same time in all wave sources.

As would be seen in ⑷, that of ion sphere CDW radiator is rather different.

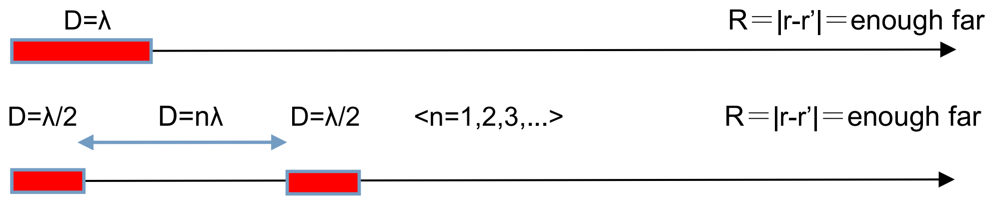
It is similar operation as opening and closing stage(charge density stage) curtain.

$\phi(r,t) = \oiiint dV\rho(r',t-R/c)/4\pi\varepsilon(|r-r'|) = \oiiint dV\rho(r')\exp j\omega(,t-R/c)/4\pi\varepsilon(|r-r'|)$

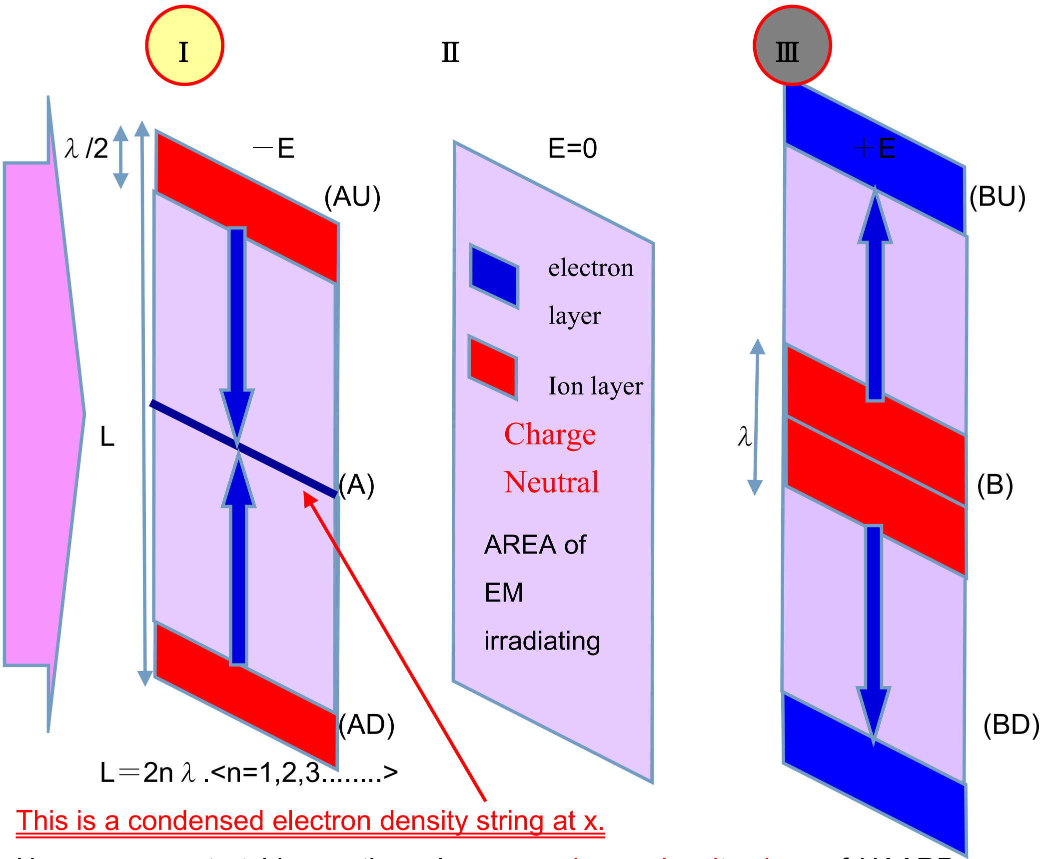
$\exp -j(kx) + \exp -j(k(x+\lambda/2)) = \exp -j(kx) + \exp -j(kx+\pi) = 0$.



⑶nothing radiation toward side by side line.



Pulse Trains by Flip Flop CDW Radiator



<u>This is a condensed electron density string at x.</u>

However as x stretching on,those becomes charge density plane of *HAARP*.

⑷By each phase of input EM,modulated electron density has also 3phase.

phaseⅡ： E=0 is nothing modulation.Electron and Ion density cancell with each other.

phaseⅠ： −E is to collect **electron to center line(EC)**,while ion zone emerge at the edges by width λ/2 or less(☞:).We set irradiating height **L＝nλ**.Thus EC and both edges become CDW radiator.Note incident EM wave is to scan x axis direction for length＝U*),which accomplish plane wave source (area＝L×U) of CDW..

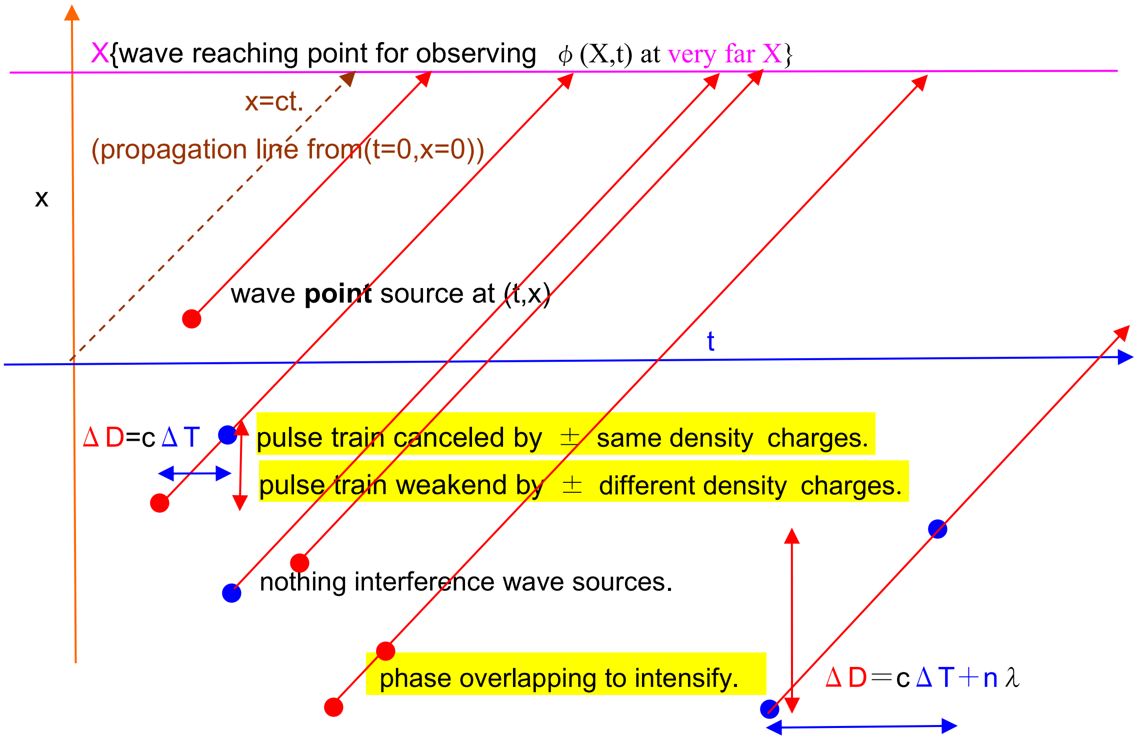
phaseⅢ： +E is to emerge ion zone at center(IC) with width= λ,while electron zone emerge at both upper and lower edges with width= λ/2.Those also become downward radiator.

Re-radiated CDW(plane wave) is to go toward ground as alternate wave form each sources. Kernel point is that **CDW pulses trains overlapping** in **propagation space** is designed by taking **optimized sources**{A,AU,AD;B,BU,BD}**distance configuration**.Following are those discussion.

(5) $\phi(X,t) = \int dx\, \rho(x, t - R/c)/4\pi\varepsilon|\mathbf{X}-\mathbf{x}|$. <$R \equiv |\mathbf{X}-\mathbf{x}|$, $c \equiv$ velocity of light, $K \equiv 4\pi\varepsilon$>.

Retarted potential estimation is essential,note the term $t - R/c$.

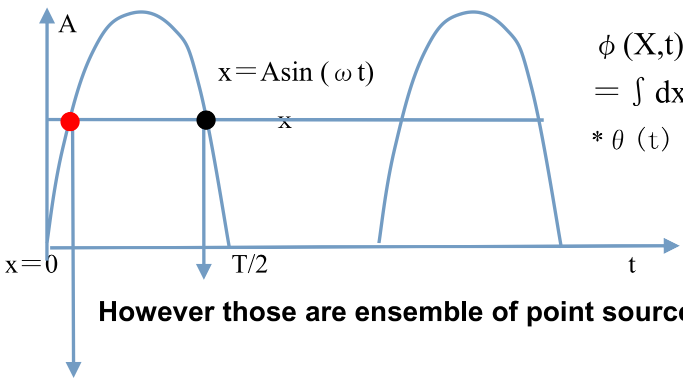
In the below,we analysis **pulse train** in **propagation space**<(t,x)plane from ion sphere to ground}from each wave source **{A,AU,AD;B,BU,BD}**>.The problem is being of **interference between sources**.Then the condition becomes evident in below figure.



Flip Flop CDW Radiator(FFCR) are multi wave sources at different points.There by those configuration determine **interference** between those sources.**The criterion** is $\Delta D = c\Delta T$,where ΔD and ΔT are space and time **distance** between two sources.

Note **FFCR** sources are not point one,but **finite time and space length**.

If flip {AU,AD;B,BU,BD} flip length are $x = A\sin(\omega t) = (\lambda/2)\sin(\omega t)$, ϕ is



$$\phi(X,t) = \int dx\, \rho(x, t - |X - x|/c)/KR$$
$$= \int dx\, \rho_0 \theta[A\sin(\omega(t - |X - x|/c)]/KR.$$

* $\theta(t)$ is step function.

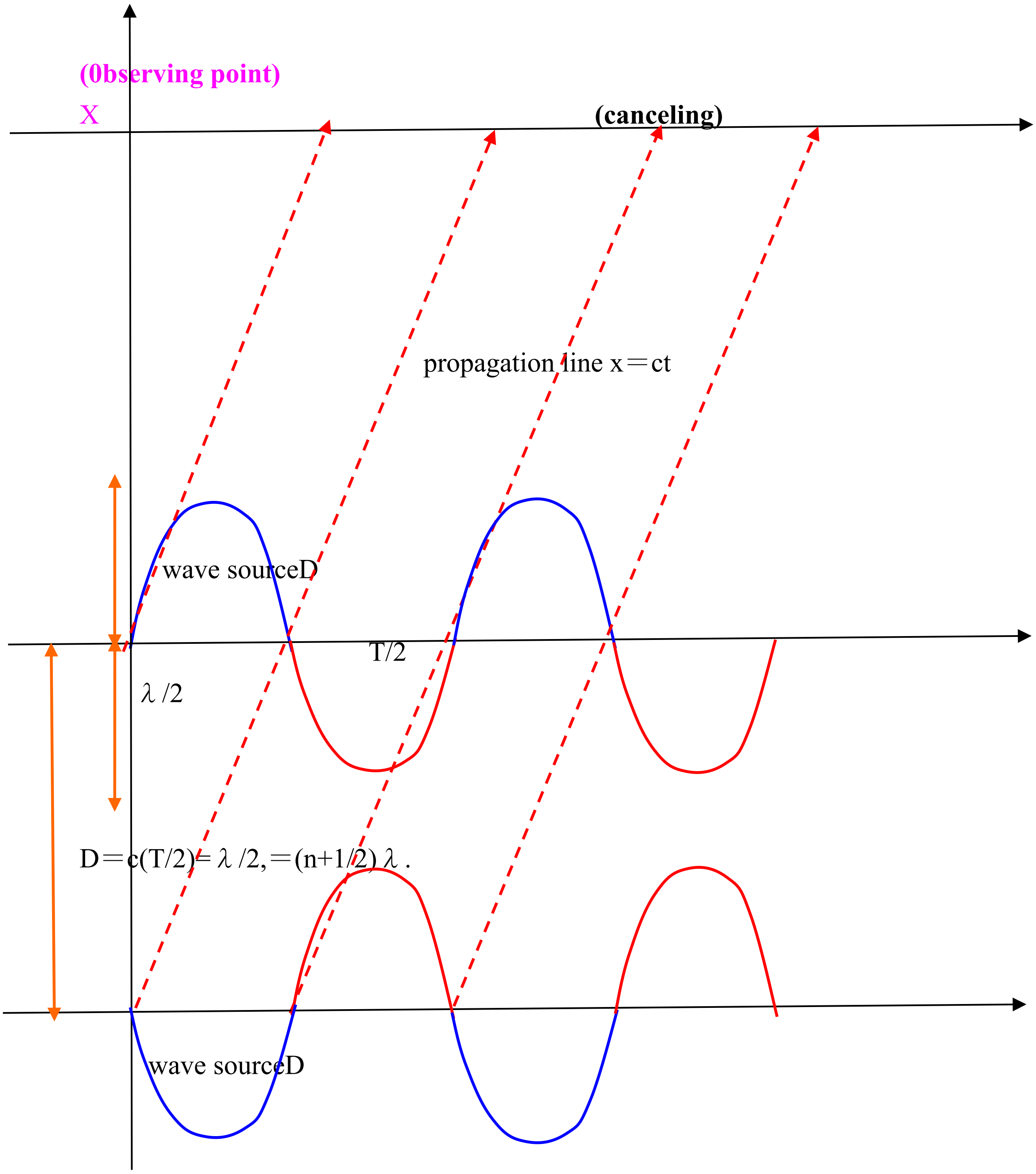
However those are ensemble of point sources expressed in above integral.

Retarted Potential as Propagating Wave Synthesizer<for example>.

ϕ (**X,t**)＝∫dx ρ (x,t－|X－x|/c)/R＝∫dx $\rho_0\,\theta$ [Asin (ω (t－|X－x|/c)]/R.

Propagator of same charge Overlapping → intensifying

Propagator of different charge Overlapping →weakening

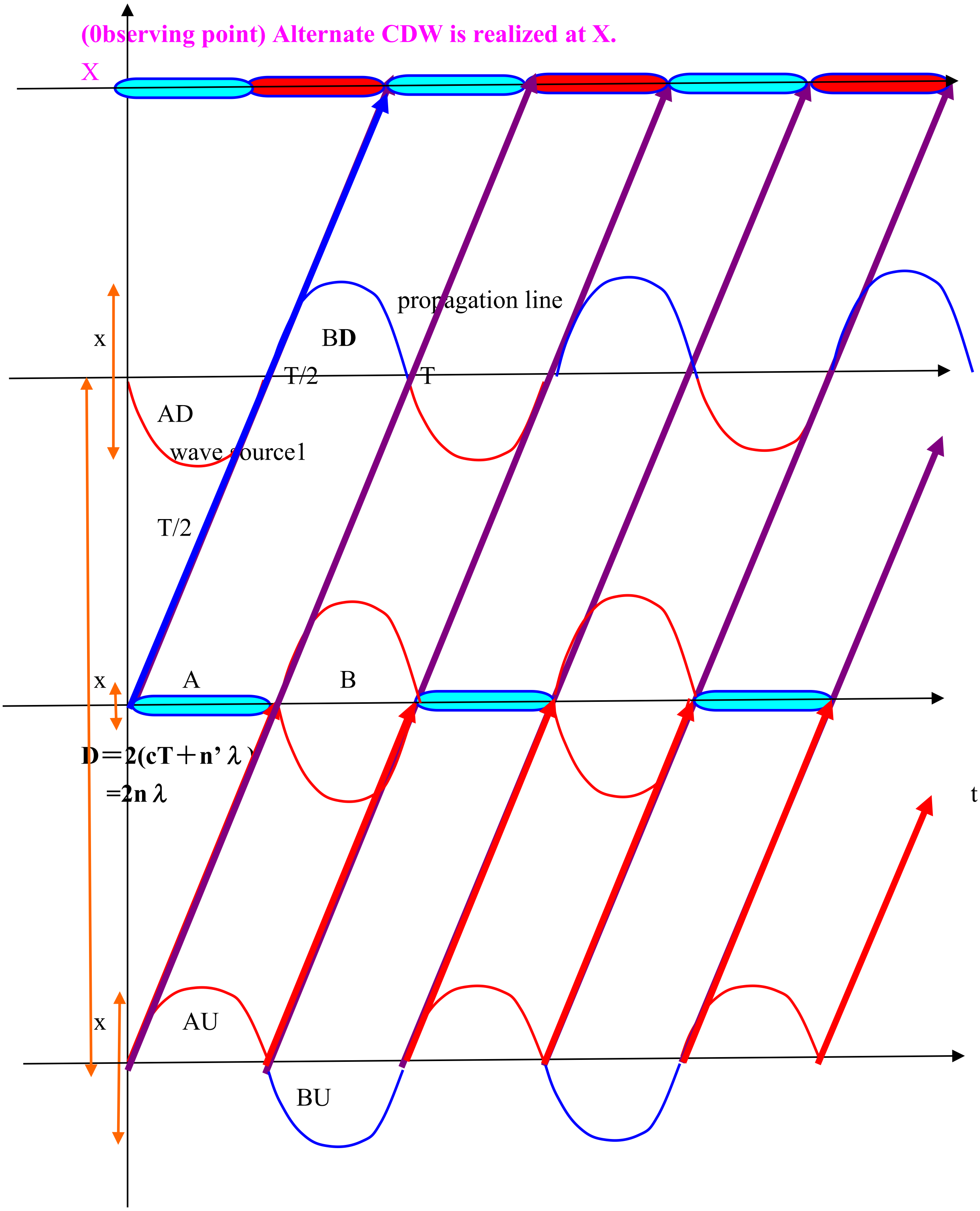


Retarted Potential as Propagating Wave Synthesizer.

$\Phi(\mathbf{X},\mathbf{t}) = \int dx\, \rho\, (x,t-|X-x|/c)/R = \int dx\, \rho_0\, \theta\, [A\sin(\omega(t-|X-x|/c)]/R.$

No Canceling between A and{AD,AU}.And overlapping between {AD and AU}.

No Canceling between B and{BD,BU}.Andt overlapping between {BD and BU}.



APPENDIX4:Sample calculation of A(ω).

Note this is not exact calculation due to no consideration of relativistic effect.

$|A|^2=\{-(\omega_P^2-\omega^2)^2+\sqrt{[(\omega_P^2-\omega^2)^4+(8/\pi^2)\sigma_I^2(\varepsilon_0E_0/e)^2\omega_P^4\omega^4]}\}/(8/\pi^2)(N_e\sigma_I)^2\omega^4.$

|A|

$=\{-(\omega_P^2-\omega^2)^2+\sqrt{[(\omega_P^2-\omega^2)^4+(8/\pi^2)\sigma_I^2(\varepsilon_0E_0/e)^2\omega_P^4\omega^4]}\}$^(1/2)/$(2\sqrt{2}/\pi)(N_e\sigma_I)\omega^2$.

Variable{$\omega=2\pi$x2.8Mhz＝17.6x10^6.,～2πx28MHz＝17.6x10^7.;

E_0＝1～1000V/m}

e＝1.61×10^{-19}, m_e＝9.1×10^{-31}, $\sigma_I=\sigma_N=\pi(65\text{x}10^{-12}\text{m})^2$＝1.3x10^{-20}m^2,

N_e＝10^{12}/m^3.(E layer)　　$(N_e\sigma_I)$＝1.3x10^{-8}.　　$(e/m_e)E_0$＝1.76x10$^{11}E_0$.

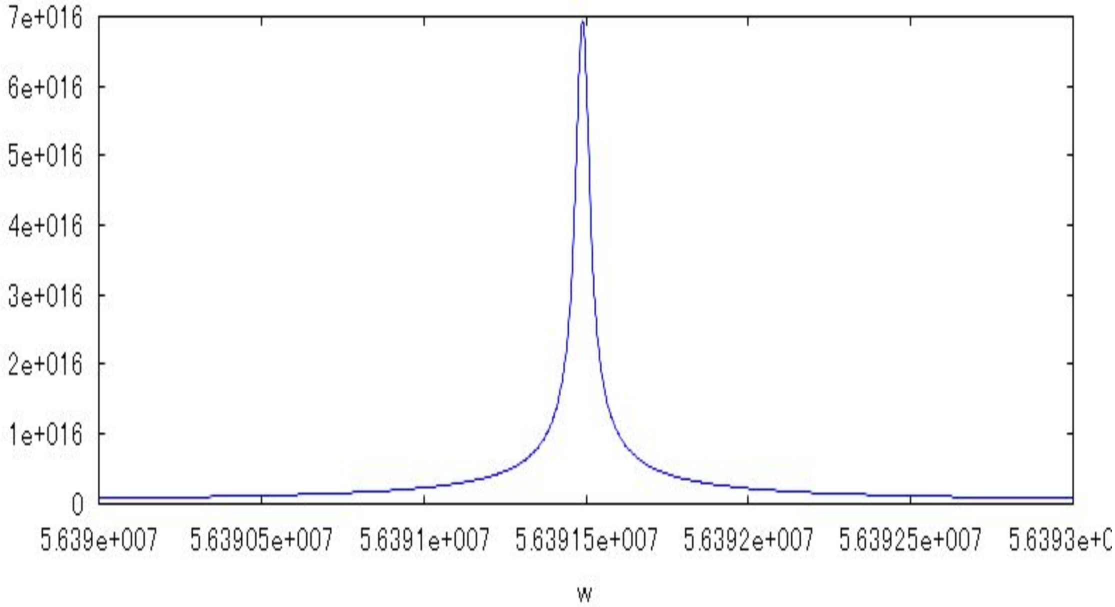
$f_P=\sqrt{(e^2N_e/m_e\varepsilon_0)}/2\pi=8.97\sqrt{N_e}$.　　<$\varepsilon_0$＝8.85x10-12F/m>

＊ ω_P＝2πx8.97MHz＝5.64x10^7.

$8(\sigma_I\varepsilon_0E_0/\pi e)^2$＝4.2x10^{-25}.

$(2\sqrt{2}/\pi)(N_e\sigma_I)$＝1.17x10^{-8}.

```
plot2d((-(3.18*10^15-w^2)^2+((3.18*10^15-w^2)^4+4.2*10^(-25)*10^31*w^4)^0.5)^0.5/1.17
*10^(-8)*w^2,[w,56.39*10^6,56.393*10^6]);
```



This is evidently too large peak value due to no consideration of relativistic effect.

Maybe electron driving force is sufficient strong to be near velocity of light.

☞:Calculator **MAXIMA** will not reveal the tailing edges(1e+016＞0....）.

Maybe **band width** is not so narrow.

$|A|$
$=\{-(\omega_P^2-\omega^2)^2+\sqrt{[(\omega_P^2-\omega^2)^4+(8/\pi^2)\sigma_I^2(\varepsilon_0 E_0/e)^2\omega_P^4\omega^4]}\}$^(1/2)/$(2\sqrt{2}/\pi)(N_e\sigma_I)\omega^2$.

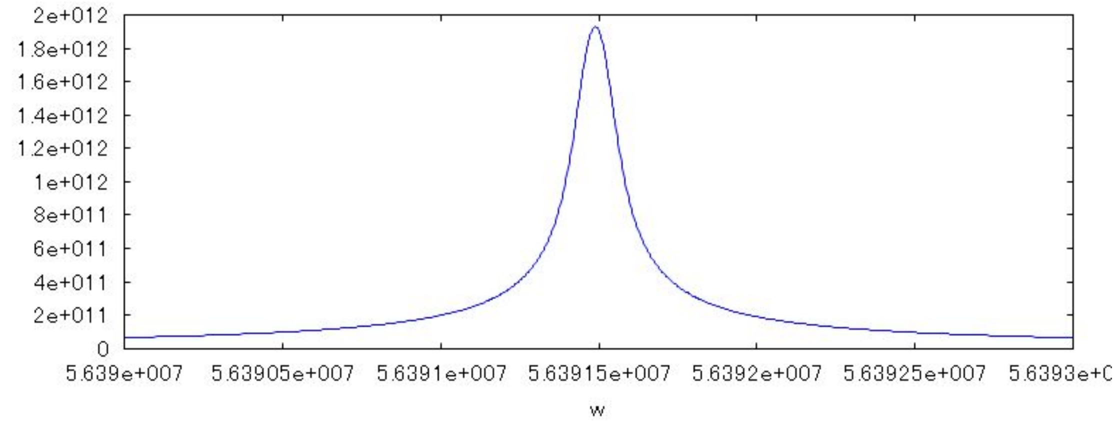
Variable{ $\omega=2\pi$ x2.8Mhz＝17.6×10^6.,～2π x28MHz＝17.6×10^7.;
E_0＝1～1000V/m}

$e=1.61\times10^{-19}$, $m_e=9.1\times10^{-31}$, $\sigma_I=\sigma_N=\pi(65\times10^{-12}m)^2=1.3\times10^{-20}m^2$,
$N_e=10^{12}/m^3$.(E layer) $(N_e\sigma_I)=1.3\times10^{-8}$. $(e/m_e)E_0=1.76\times10^{11}E_0$.
$f_P=\sqrt{(e^2N_e/m_e\varepsilon_0)}/2\pi=8.97\sqrt{N_e}$. <$\varepsilon_0$＝8.85x10-12F/m>

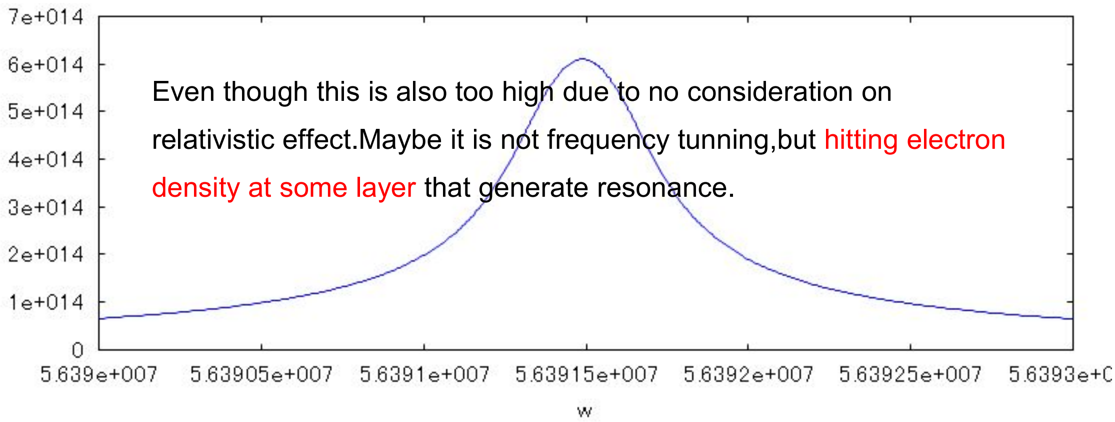
＊ $\omega_P=2\pi$ x8.97MHz＝5.64×10^7.

Following are correction by increasing $\sigma_I\rightarrow10\sigma_I$;;$\rightarrow100\sigma_I$
$8(\sigma_I\varepsilon_0E_0/\pi e)^2=4.2\times10^{-25}$. → $=16.8\times10^{-25}$.
$(2\sqrt{2}/\pi)(N_e\sigma_I)=1.17\times10^{-8}$. → $=4.68\times10^{-8}$.

plot2d((-(3.18*10^15-w^2)^2+((3.18*10^15-w^2)^4+100*4.2*10^(-25)*10^31*w^4)^0.5)^0.5/0.225*(10^12*10*1.3*10^-20)^2*w^2,[w,56.39*10^6,56.393*10^6]);



plot2d((-(3.18*10^15-w^2)^2+((3.18*10^15-w^2)^4+10000*4.2*10^(-25)*10^31*w^4)^0.5)^0.5/0.225*(10^12*100*1.3*10^-20)^2*w^2,[w,56.39*10^6,56.393*10^6]);



APPENDIX5: Relativistic Correction of Dynamic Equation.

Note also this is not exact calculation ,but very coarse estimation.

$m(d/dt)<dx/dt/\sqrt{}[1-(dx/dt)^2/c^2]>$

$=<m/\sqrt{}[1-\beta^2]>d^2x/dt^2+m\beta^2 d^2x/dt^2/[1-\beta^2]^{3/2}=m<1/\sqrt{}[1-\beta^2]+\beta^2/[1-\beta^2]^{3/2}>d^2x/dt^2=$

$=m/\sqrt{}[1-\beta^2]<1+\beta^2/[1-\beta^2]>d^2x/dt^2=m/<\sqrt{}[1-\beta^2]>^3 d^2x/dt^2.$

Relativistic Correction is mass increasing by factor J(something constant in periodic motion).

$(d^2x/dt^2)=-(N_e\sigma_I|dx/dt|)(dx/dt)-(e^2N_e/m_e\varepsilon)x-(e/m_e)E_0\exp j(\omega t).$

$\rightarrow(d^2x/dt^2)=-(N_e\sigma_I|dx/dt|)(dx/dt)-(e^2N_e/Jm_e\varepsilon)x-(e/Jm_e)E_0\exp j(\omega t).$

$=-(N_e\sigma_I|dx/dt|)(dx/dt)-(e^2N_e/m_e\varepsilon)(x/J)-(e/m_e)(E_0/J)\exp j(\omega t).$

It may be decreasing also E_0 by (E_0/J)..

Relativistic Correction by $E_0 \rightarrow (E_0/J)$.

$\|A\|=$
$\{-(\omega_P^2-\omega^2)^2+\sqrt{}[(\omega_P^2-\omega^2)^4+(8/\pi^2)\sigma_I^2(\varepsilon_0E_0/e)^2\omega_P^4\omega^4]\}$^(1/2)/(2$\sqrt{}$2/$\pi$)($N_e\sigma_I$)$\omega^2$.

↓

$\|A\|=$
$\{-(\omega_P^2-\omega^2)^2+\sqrt{}[(\omega_P^2-\omega^2)^4+(8/\pi^2)\sigma_I^2(\varepsilon_0(E_0/J))/e)^2\omega_P^4\omega^4]\}$^(1/2)/(2$\sqrt{}$2/$\pi$)($N_e\sigma_I$)$\omega^2$.

It may be decreasing peak amplitude value as $|A|\leqq c/2f$.

APPENDIX6:Charge Particle Equations in Alternate EM Filed. 2016/4/26,28

(1) $d\mathbf{V}/dt=(q/m)\mathbf{E}+(q/m)\mathbf{V}\times\mathbf{B}$.

$$\mathbf{V}\times\mathbf{B}=\begin{pmatrix} e_x, & e_y, & e_z \\ V_x, & 0, & V_z \\ 0, & B\sin(\omega t), & 0 \end{pmatrix}$$

$\mathbf{E}=[0, 0, E\sin(\omega t)]$

$\mathbf{B}=[0, B\sin(\omega t), 0]$

$\mathbf{V}=[V_x, 0, V_z]$

$=[-V_z B\sin(\omega t), 0, V_x B\sin(\omega t)]$.

$dV_z/dt=qE\sin(\omega t)+V_x B\sin(\omega t)$	$\rightarrow V_x=<(dV_z/dt)-qE\sin(\omega t)>/B\sin(\omega t)$
$dV_x/dt=-V_z B\sin(\omega t)$	$\rightarrow V_z=-(dV_x/dt)/B\sin(\omega t)$.

(2)method of variable separation.

$\rightarrow dV_z^2/dt=2dV_z/dt.V_z=-2[qE\sin(\omega t)+V_x B\sin(\omega t)](dV_x/dt)/B\sin(\omega t)$

$=(d/dt)[-dV_x/dt/B\sin(\omega t)]^2$.

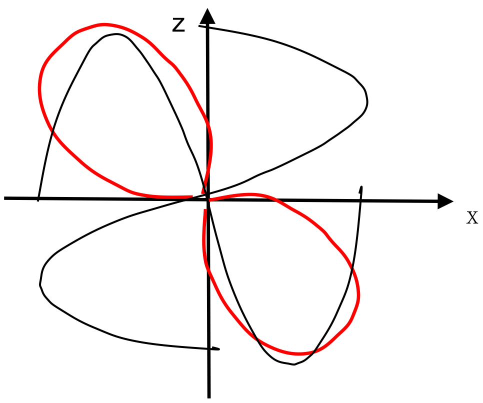
$\rightarrow dV_x^2/dt=2.V_x.dV_x/dt=-2V_z B\sin(\omega t)<(dV_z/dt)-qE\sin(\omega t)>/B\sin(\omega t)$

$=(d/dt)[<(dV_z/dt)-qE\sin(\omega t)>/B\sin(\omega t)]^2$.

*As are seen in this Appendix6,this report can not be complete by author,

but recommend you to revise those toward completion.

Imagined electron trajectory in cyclic mode(=W looping).



APPENDIX7: Secant Law as VHF Reflection by Ion Sphere Layer.

(1) curl**H**$=\partial_t$**D**$+$**j**$=(j\omega\varepsilon_0+(Ne^2/j\omega m))E\exp(i\omega t)$

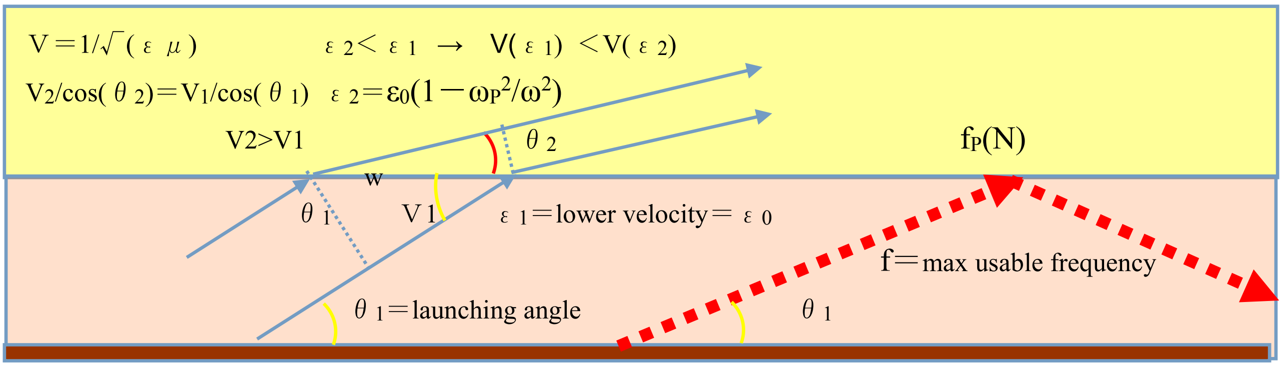
$=j\omega\varepsilon_0(1-Ne^2/\varepsilon_0 m\omega^2)E\exp(i\omega t)\equiv j\omega E\exp(i\omega t)\varepsilon_0(1-\omega_P^2/\omega^2).\rightarrow\omega_P^2\equiv Ne^2/\varepsilon_0 m.$

$\rightarrow$ $\varepsilon_0(1-\omega_P^2/\omega^2)\equiv\varepsilon_{0I.}$ <permitivity of ion sphere with density N>

(2) m(d**V**/dt)$=$e**E**exp(iωt).→V$=$(e/jωm)Eexp(iωt).

(3) **j**$=$Ne**V**=Ne.e/jωm)Eexp(iωt).

(4)Inflection Law.



(5)**Secant Law**$<\sin(\theta_1)=f_P/f.;\ \omega_P^2\equiv Ne^2/\varepsilon_0 m>$

$w=V_2/(\cos\theta_2)=V_1/\cos(\theta_1)\ \rightarrow\ \cos(\theta_1)/(\cos\theta_2)=V_1/V_2=\sqrt{(\varepsilon_2/\varepsilon_1)}.$

$\sin(90-\theta_1)/\sin(90-\theta_2)=\cos(\theta_1)/\cos(\theta_2)=\sqrt{(\varepsilon_2/\varepsilon_1)}=\sqrt{(\varepsilon_I/\varepsilon_0)}=\sqrt{(1-Ne^2/m\varepsilon_0\omega^2)}.$

$\cos(\theta_1)/(\cos\theta_2)=V_1/V_2=\sqrt{(\varepsilon_2/\varepsilon_1)}.\ \rightarrow\theta_2=0.\ \rightarrow\ \cos(\theta_1)=V_1/V_2=\sqrt{(\varepsilon_2/\varepsilon_1)}.$

$\cos^2(\theta_1)=(\varepsilon_2/\varepsilon_1)=(1-\omega_P^2/\omega^2)=1-\sin^2(\theta_1).\rightarrow\quad \sin(\theta_1)=\omega_P/\omega.$

(6)**The meaning of secant law the near resonance mode.**

$\omega_P<\omega\ \rightarrow\ 1>\varepsilon_2=\varepsilon_0(1-\omega_P^2/\omega^2)=\varepsilon_0\cos^2(\theta_1)>0.$

Thus MUF〈maximum usable frequency for communication)is near resonance mode.

(7)Incident wave with f_P can generate full resonance in N density layer even any launching angle$=\theta_1.<90°$,so such wave reflect and return toward ground.Such wave never fail to generate CDW radiation by mentioned mechanism in **APPENDIX4:**(4).

HAARP uses plasma oscillation to gain CDW intensity !!!.

Certainly ion sphere is string of **Satan's harp** radiating harmful **CDW** toward grand and stratum to generate **earthquake at critical hypo-center**.

HAARP is nothing,but unprecedented criminal against humanity.