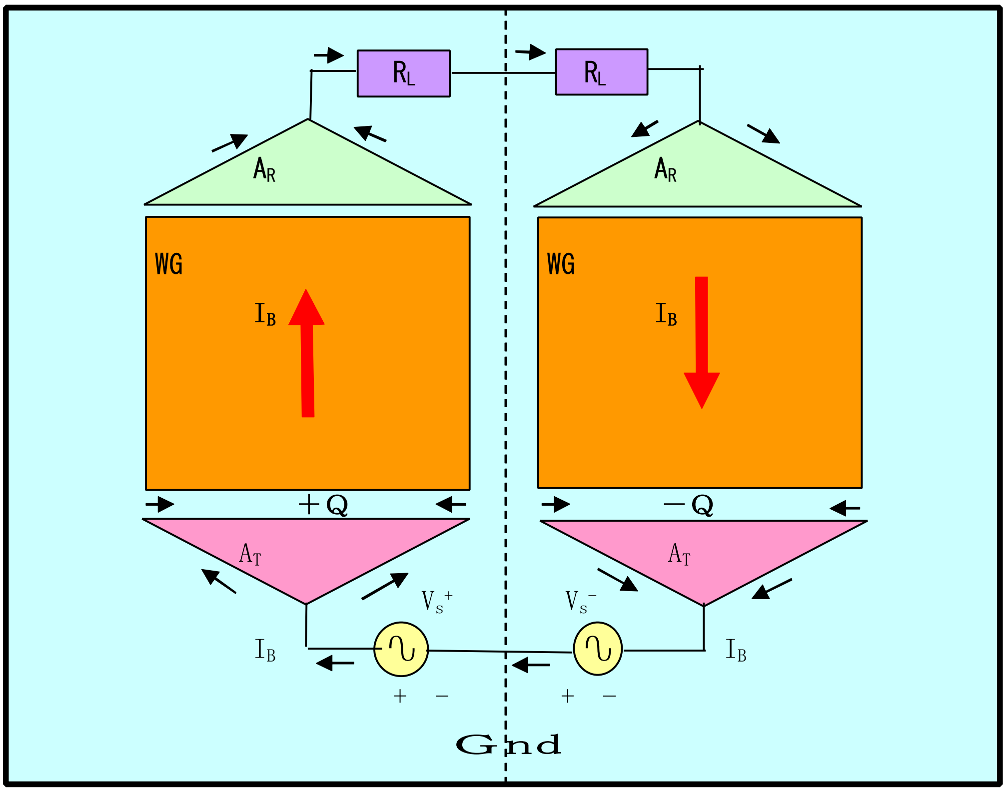
—B Wave Generator Design Example of Twin H_2O Wave Guide—

'08/7/9^11.

Please let's try the new modifed version of BWG.The foremer bare feeder circuit had serious power loss to accomplish critical condition by H_2O wave guide.
New design for charge feeder circuit(**CFC**) intend to secure less power loss by full EM field shield of simple circuit configuration.

The BWG design principle was described in click here.

❶Double Balanced Earthing System and the Charge Feeeding Difficulty.



(1)**The more power loss in bare discone charge feeder circuit(A_T):**

As is seen in above, in order to radiate charge density wave(B wave) in WG、the charge density on A_t shoud be monotonous as possible.Hence line form of feeding current I_t must be spreaded in wide area at A_t circumference.Then current on discone yields power loss for its radiation and Ohmic one.

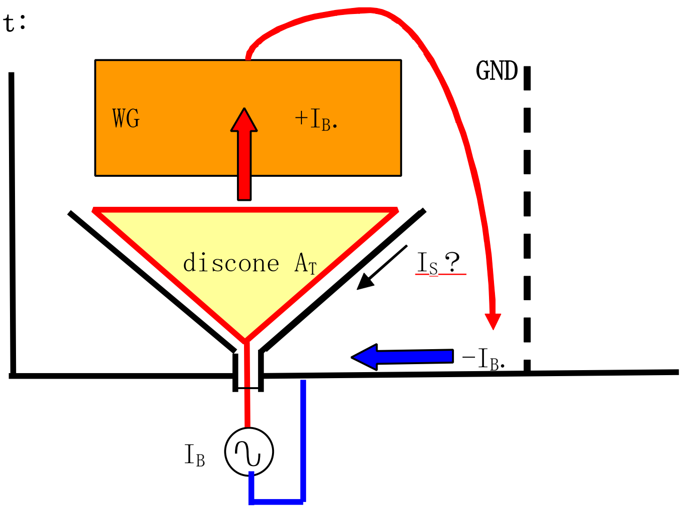
(2)**The feeder current must be supplied with lossless transmission line.**

In the past,author couldn't secure such feeder due to technical difficulty.

❷Simplified Charge Feeder Circuit Design the New Modified Version :

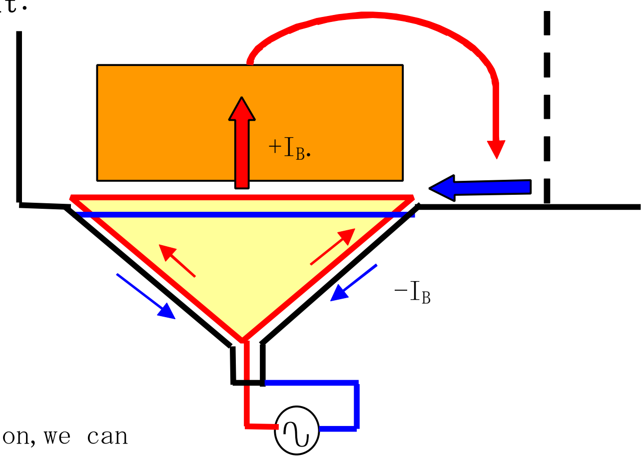
①The topological conversion of shield feeder circuit:

⑴**the original circuit:**

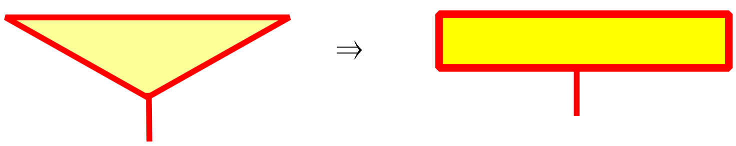


In any situation, circuit current I_B must be circulated in a closed circuit, that is, feeding current $+I_B$ must be terminated by returning ground curret $-I_B$. Then non-closed shield current I_S become indefinite in above circuit configuration.

⑵**the improved circuit:**

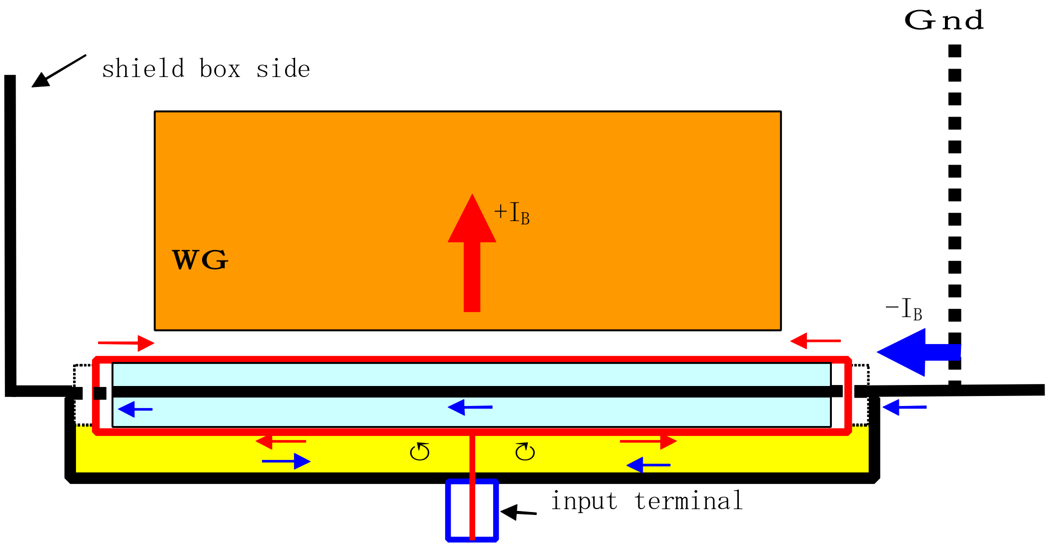


In above configuration, we can establish **transmission line** feature by **dual discone surfaces.** And also mono-pole antenna feature can be secured. Then dual discone surface configuration could be more siplified as following easy realizable configuration.



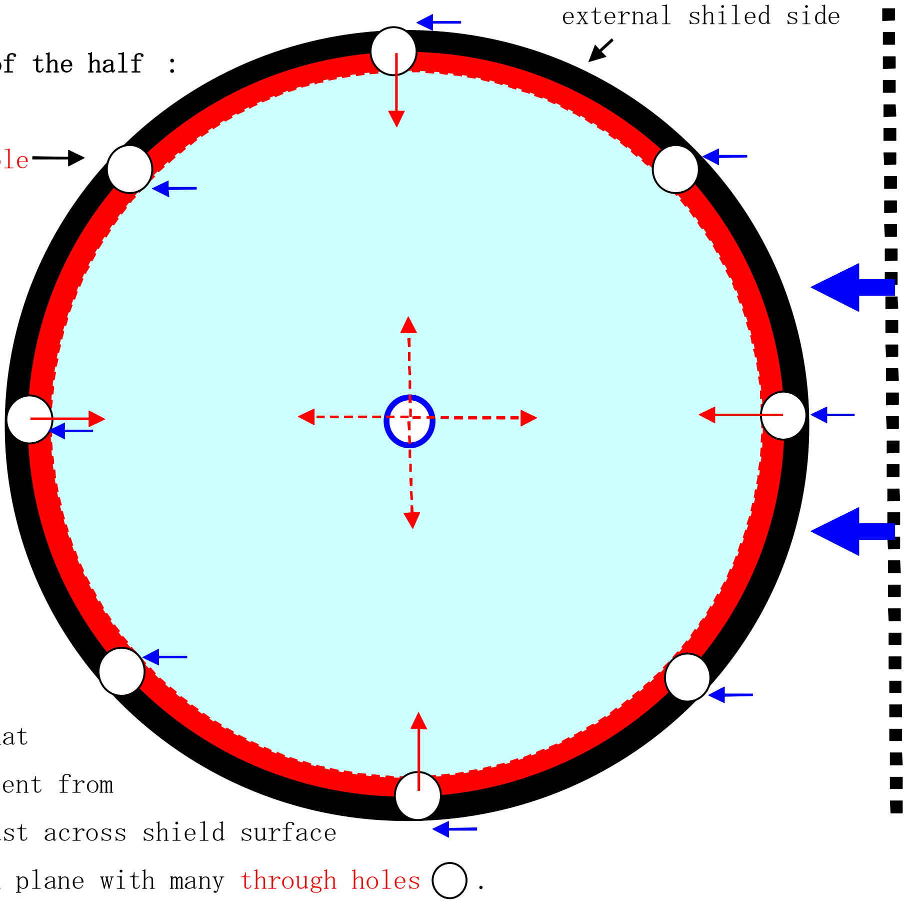
②(1)**Cross View of the half** ：

Yellow and skyblue zone are insulators.



Red is foward current, blue is backward one. Black is shield surface on which backward current flows.

(2)**Top View of the half** ：



Then note that feeding current from generator must across shield surface to radiation plane with many through holes ◯ .

❸Charge feeder circuit(CFC) parameter:

Now author have not sufficient ablity to analysis CFC and to derive the parameters. So the problem shall be delagated to readers. As is wellknown, coaxial transmission line has constant distributed circuit parameters, while dual disc plates transmission line has **non constant distributed circuit parameters**. Therefore, it could no be said correctly transmission line.

❹Dual disc transmission line(cylinderical symmetric field) :

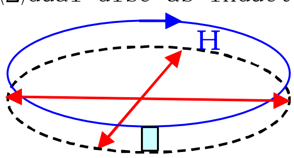
Coaxial or pararell feeder are wellknown its transmission line characteristic.

Following are simplified analysis on dual disc(DD) transmission line.

(1)dual disc as capacitor of radius$=x$, the gap length$=g$, permitivity$=\varepsilon$:

$c(x)=\pi x^2\varepsilon/g.$ $\Rightarrow$ $dc/dx\equiv C(x)\equiv 2\pi x\varepsilon/g.$

(2)dual disc as inductor of radius$=x$ and the gap length$=g$, permeability$=\mu$:

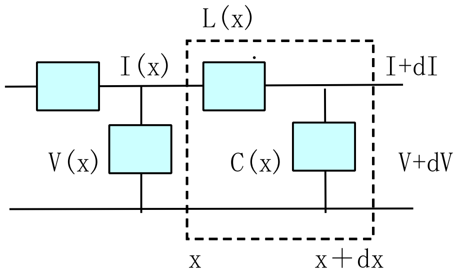


$I=\oint ds.\ H=2\pi x H(x).$

$E=½ L I^2=½\mu \oiint dv H^2(x)=½\mu\int_0^x dx 2\pi g x[I/2\pi x]^2$

$l(x)=(g\mu/2\pi)\int_0^x dx[1/x].$ $\Rightarrow$ $L(x)\equiv dl/dx=g\mu/2\pi x.$

(3)**DD circuit equation and the solution:**



$dV/dx=-I(x)\langle j\omega L(x)\rangle.$

$dI/dx=-V(x)\langle j\omega C(x)\rangle.$

$\varepsilon\ \mu\equiv 1/c^2$:propagation velocity.

$d^2V/dx^2=-dI/dx\langle j\omega L(x)\rangle-I(x)\langle j\omega(dL/dx)\rangle.\ d^2V/dx^2=-V\langle\omega^2CL\rangle++dV/dx\langle(dL/dx)/L\rangle.$

$d^2I/dx^2=-dV/dx\langle j\omega C(x)\rangle-V(x)\langle j\omega(dC/dx)\rangle.\ d^2I/dx^2=-I\langle\omega^2CL\rangle+dI/dx\langle(dC/dx)/C\rangle.$

$d^2V/dx^2=-V(x)\langle\omega^2\varepsilon\ \mu\rangle-(1/x)(dV/dx).\rightarrow\ 0=d^2V/dx^2+(1/x)(dV/dx)+(\omega/c)^2V.$

$d^2I/dx^2=-I(x)\langle\omega^2\varepsilon\ \mu\rangle+(1/x)(dI/dx).$

(a)$0=d^2V/dx^2+(1/x)(dV/dx)+(\omega/c)^2V.$ $x\equiv bz.\rightarrow dx=bdz$

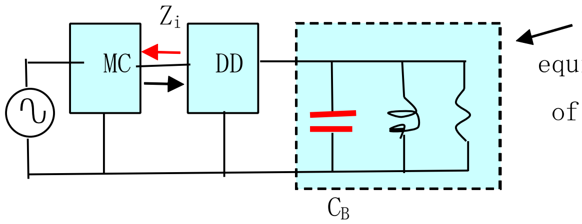
$(1/x)(dV/dx)=(1/bz)(dV/bdz),\ d^2V/dx^2=(1/b^2)d^2V/dz^2.$

-**Bessel function J_0 of 0th order**(stationary wave amplitude)－

$0=d^2J_0/dz^2+(1/z)(dJ_0/dz)+J_0(z/k).$ $k\equiv(\omega/c).$

(b)$I(x)=-(dV/dx)/\langle j\omega L(x)\rangle.$ $J_0'=-J_1.$

⑷Then problem is how becoming of reflection wave from output load?.
The impedance matching as maximum charge output in C_B with minimum power loss.



equivalent output load＝Z_B.
of A_T.

⑸Z_i could not be ajusted ,therefore,it must be matched by matching network MC connecting posterior of signal source.

caution:Such design idea may be possible by anyone,now the problem is to show **the experimental evidence of over critical condition** by water wave guide of BWG. In anyway,it is low cost for anyone to realize,however feeder circuit making and the circuit theoretical simulatin may be rather difficult. Author wish you may get good luck at first.