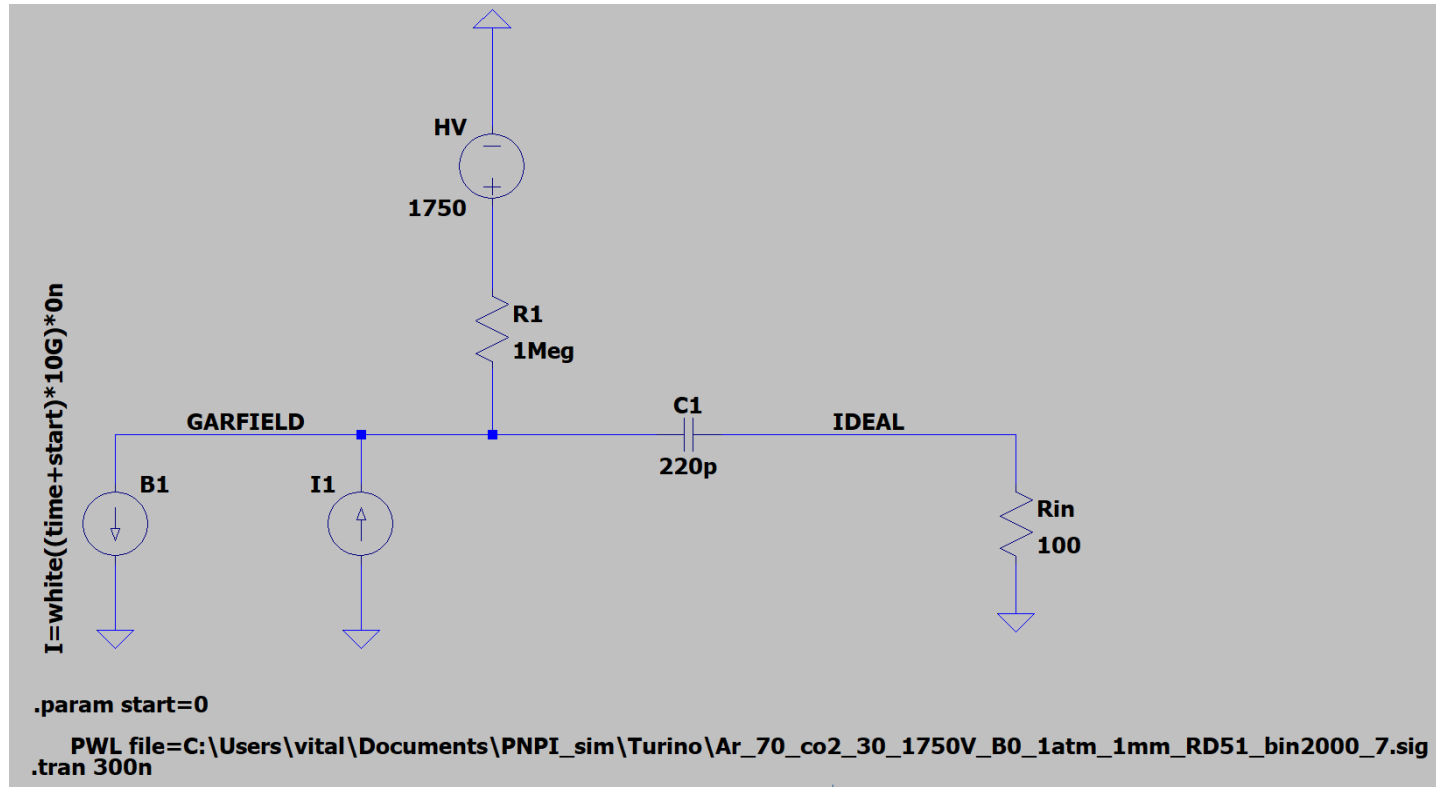# Realistic Straw Signal Simulation v0.1
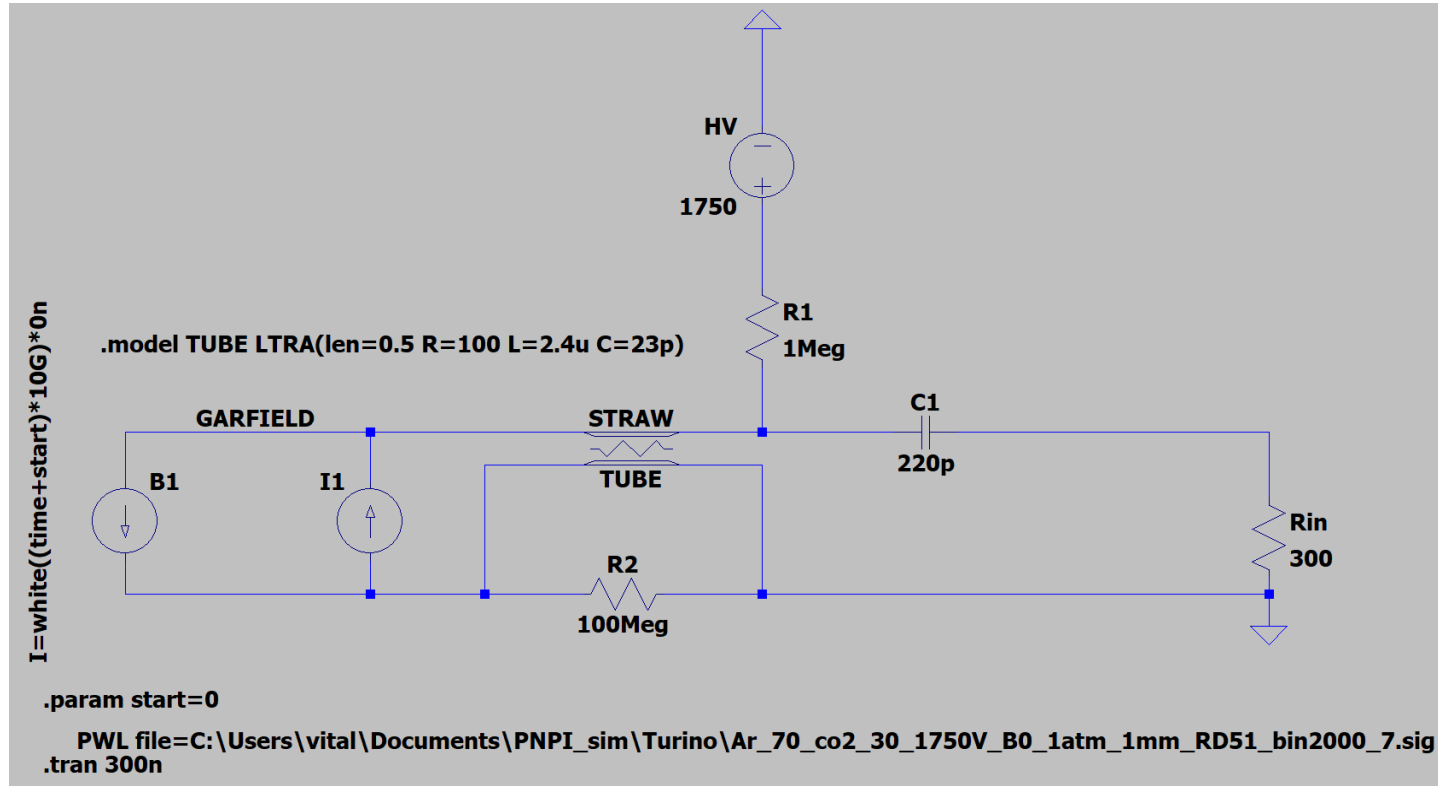

V. Bautin Nov 2023

Ideal Straw

B1 — additive white Gaussian noise (AWGN) sourse. It has function, where:
time — simulation time, always starts with 0.0s
start — is set by our script randomly each simulation
10G — noise bandwidtg, currently set to 10GHz, like… big enough

Piecewise linear (PWL) function is a GARFIELD output file describing straw tube signal current in Amps.

HV of 1750V is applied via 1MOhm resistor
AC coupling via 220pF capacitor
Rin simulates amplifier input

Real Straw

HV
1750

I=white((time+start)*10G)*0n

.model TUBE LTRA(len=0.5 R=100 L=2.4u C=23p)

R1
1Meg

GARFIELD

STRAW

C1
220p

B1

I1

TUBE

Rin
300

R2
100Meg

.param start=0

PWL file=C:\Users\vital\Documents\PNPI_sim\Turino\Ar_70_co2_30_1750V_B0_1atm_1mm_RD51_bin2000_7.sig
.tran 300n

All is the same, but Lossy Transmition Line (LTRA) added. It`s parameters are:
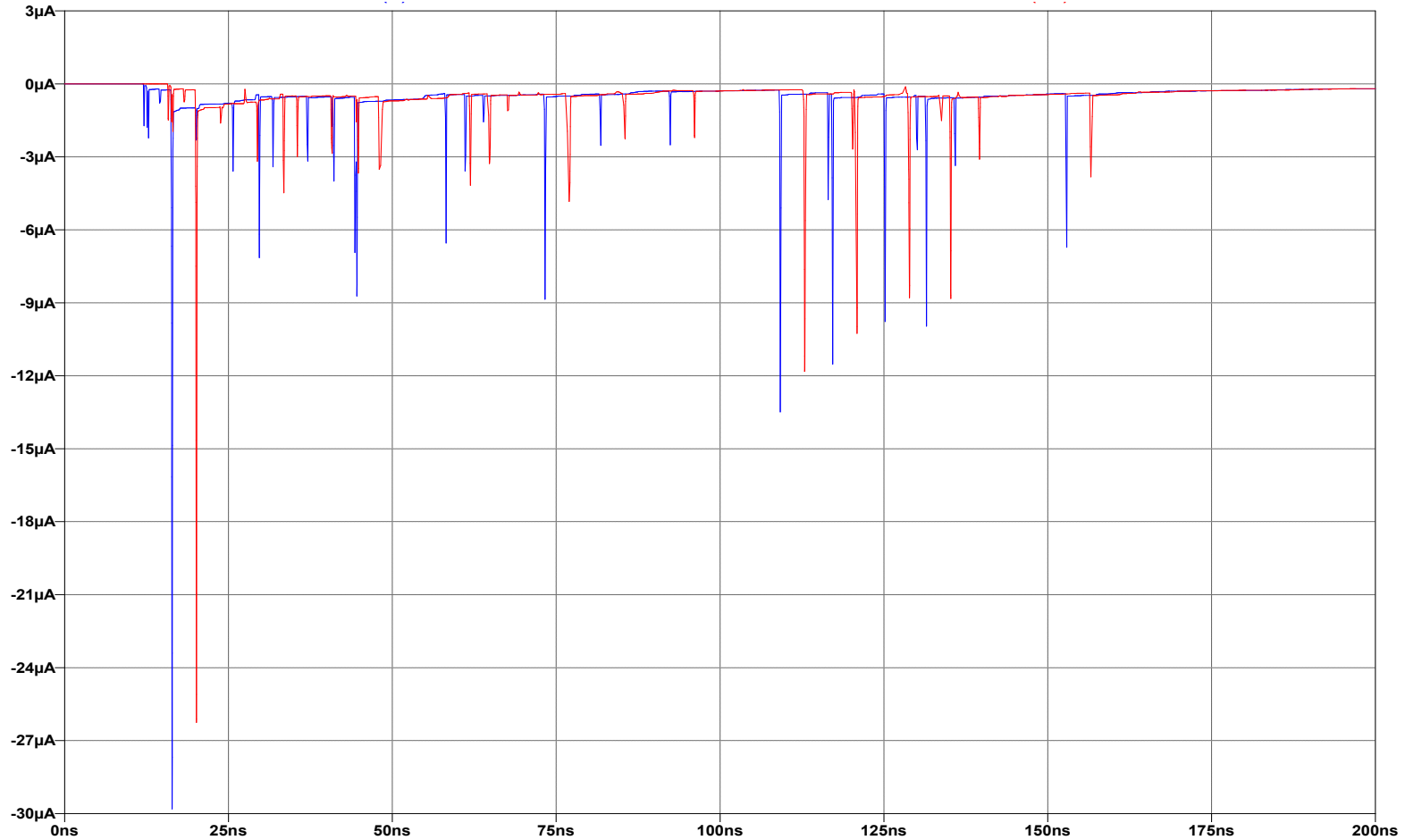R = DC resistance, Ohms per meter
L = Inductance, Henry per meter
C = Capacitance, Farads per meter,
Len = length in meters

100Meg is king of small leakage to real groung.
Needed for normal SPICE simulation engine work

Ideal and **Real** Straw Comparison

As one can see, lossy transmition line add some delay. Also attenuation, some shape «extension» changes because of capacity and «spikes» because of inductance cen be seen