Obiwannabe

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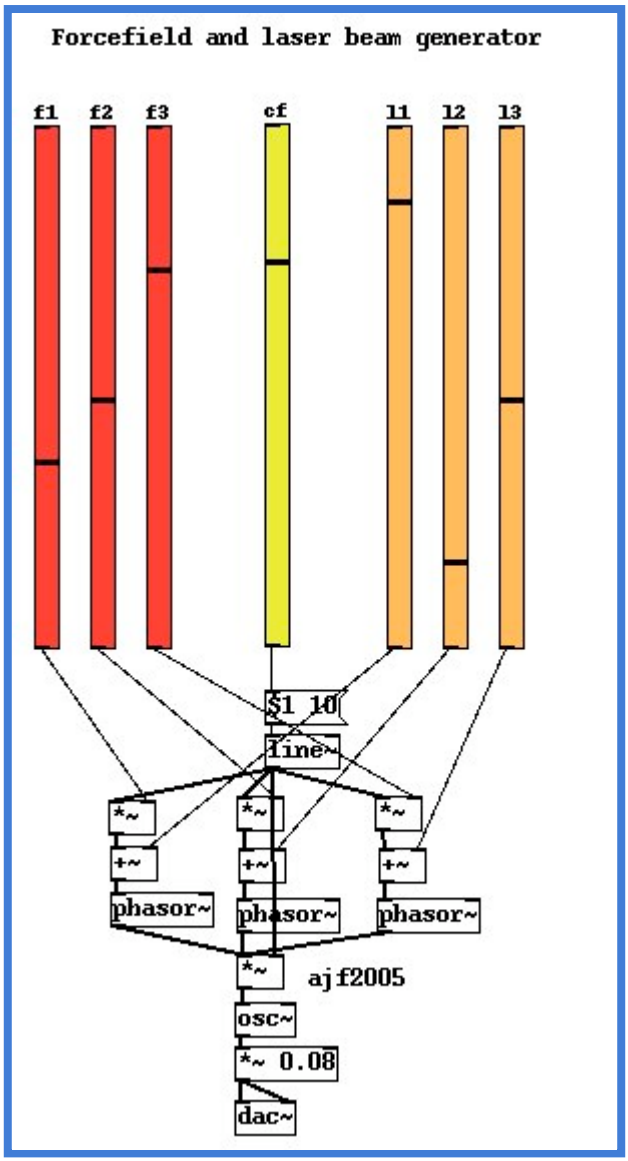
Red laser beam

Everyone knows that red laser beams make completely different sounds from green laser beams since they are meaner. Green lasers come from the good guys guns and make a much kinder sound as they vapourise flesh. Mean and nasty sounds, especially alien ones have a resonant buzzing/fizzing sound like really angry wasps stuck in a jar of marmalade. The seminal laser is the one Dr No uses to try and slice 007 in the nether-regions, but Dr Who's sonic screwdriver and a Star-Trek phaser make similar sounds (though these can only be used for good).

Now, as you know, evil sounds contain a lot of high frequency inharmonics. Babies and death-metal thrash guitar are good examples. However a laser beam is much thinner than a baby, so it's not a "big" sound, all that evil is squashed into a much smaller space. A fine place to start is with a kind of complex FM synthesis using several phasors at odd frequencies to modulate a single oscillator. This will produce many unrelated sidebands. Unlike the way we've used this arrangement before to make metalic sounds this time we want almost no common factors, the sound should be much more like noise, at least it's very dense indeed.

The patch below is good for ray-guns and force fields. It produces very complex waveforms with many beat frequencies. As you tweak the oscillator frequencies you will happen upon certain "sweet spots" which are integer ratios of the fundamental. These are the points we *don't* want, but just to the side of them are the interesting timbres. There are two sets of controls that seem to be doing the same thing, the red controls designated f1-f3 set the ratio of each phasor to the value of the center frequency cf, but the orange controls, l1-l3, add a smaller offset so you can fine tune the sidebands. If you very carefully tune the bands to get beat frequencies you can obtain slowly pulsating textures. To keep the sound from having a definite pitch the fundamental is deliberately quite high (above 500Hz). We only really want to hear the lower sidebands and those that are a result of aliasing. Most of the stuff we are interested in lives between 1kHz and 10kHz.

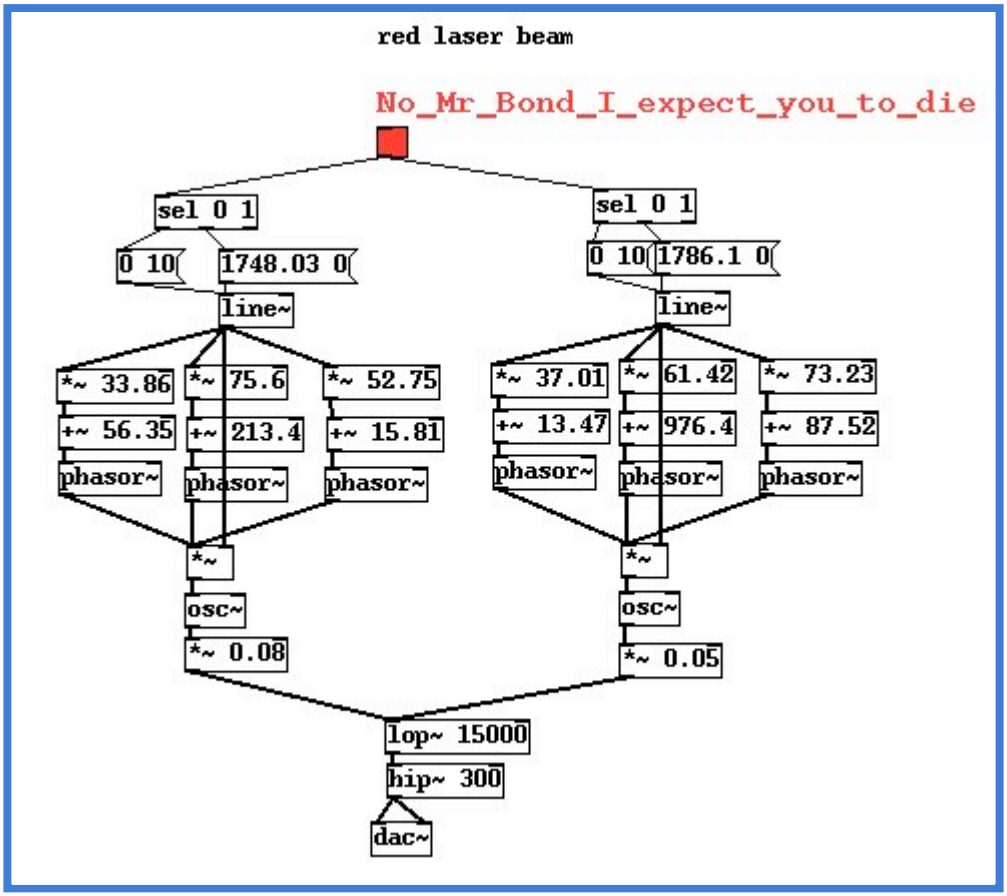


Puredata file .pd

To make a "laser" sound I picked a set of parameters from the above patch. A red cutting laser is actually sometimes a ruby laser. This is a pumped to high energy state by a xenon flash tube. The fastest you can strobe the xenon tube is about 15Hz to 30Hz, after that it starts to become one continuous arc like a neon light, both because the gas stays ionised and because few high voltage capacitors can discharge and recharge at a high frequency so the circuit loses its high peak potential. Our laser sound therefore warbles at a rate of about 20Hz, which sounds best. In fact , speaking realistically for a moment this is the only sense in which any kind of laser makes a sound. You can sometimes hear the xenon tube making a clicking sound on each pulse, it actually expands slightly because for a few nanoseconds the gas inside reaches millions of degrees in temperature. Gas lasers and the more common diode lasers make no sound at all in reality.

Here's the laser beam patch. I used two sources for a richer effect. Adding

a low pass filter on the output makes sure none of the very high frequencies get through, and a high pass filter is to make our sound "small".



Audio .mp3
Puredata file .pd

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