

## Sound in electronic music

### Sound source

When we talk about electronic music we usually refer to a music which in its original form used concrete sounds (Groupe de Recherches Musicales) and later electronically generated sounds (Gottfried Michael Koenig at West Deutsche Rundfunk).

In order to grasp the realities of electronic music and its enormous potential in giving us a new forum using a parameter not available to acoustic music composition namely the virtual acoustics we have to address certain presentation formats.

Electronic music is actually two different things, the electronic music we can hear on our home devices i.e. stereophonic streamed music via headsets or in ear headphones. The other is electronic music presented in concerts usually with a great number of speakers giving us a possibility to alter the acoustic room with the use of a mixing console and the spatialization of the content to different speakers placed in the concert hall. The live mixing of fixed media music is an art form in itself, but which with a knowledge of its possibilities can give an immersion into the music which can not be described.

Don't misunderstand the difference with a stage with a couple of DJ's booming out the music from an array of speakers placed on the stage where the audience can see their stars with a backdrop of laser and other visual effects  
with

the electronic music concert with sometimes more than 40 speakers placed around the audience in order to achieve the aforementioned spatialisation via a mixing console.

This latter situation requires the composer/conductor of his/her music to be in the CENTER of the audience in order to give a fully attentive rendering of the music in the concert situation.

It would be impossible to be the "artist" on a stage to which all attention is directed and at the same time render a fully organic live mix to the audience.

At this moment in the discussion we enter into what I call two different fields of presentation

The sound *source* experience or sound *wall*

and the sound *field* experience

Typically I'd call the rock group on a stage a sound source or sound wall experience. So is the orchestral experience with the audience directed towards a stage on which the conductor with orchestra perform classical or newly written orchestral pieces.

Talking to Boulez many years back he was very much in favour of musical venues which are designed following the needs of a modern audience. An opera house might have a stage in the middle of a room, maybe several stages and multi purpose seating capacity, all in the name of a new presentation form.

The lap top concert seen in university and experimental music scenes all use this old "look straight at the stage where the action is" approach.

Why is that ? It seems odd that only the technique is new, but the way the music is presented follows the old path.

We have seen since the drop of sales of CD's that most musicians have to tour in order to make money, the record sales aren't any longer what we were used to some 20 years back.

The contemporary music scene is living under completely different economical prerequisites. There aren't that many philanthropists handing out commissions to aspiring young composers, making it a viable route to take the laptop under the arm and giving a concert now being "seen" as an artist on stage.

But what is not taken into account is the lack of a sound installation that would be met for a fixed media piece (prerecorded electronic music with or without a live musician).

What is happening is that the audience is seeing a person tweaking and pushing pads and knobs where the sound is not stemming from the object worked on. The sound is usually coming from a typical stereo setup placed on the stage.

When speaking with clarinet virtuoso Kinan Azmeh we have discussed the problem with electronics and instruments. As soon as we have a visual reference to the sounding (violin, clarinet, horn et al.) object it is inevitable that we also think about the instrument as being the sound source. But as is the case when live electronics are involved with musicians we suddenly have a stereo rendering of the clarinet in the center of the stage. We have augmented the instrument's normal stature to be more than itself.

In my opinion I'd rather have the instrument recorded with a zillion different manipulations instead of seeing a person playing an instrument which is bigger than itself.

This is actually the reason why I haven't yet found a solution which is to my liking both conceptually as musically.

Kinan Azmeh usually uses a loudspeaker he sits on during concert, thus maintaining some sort of truth to the emanating source.

Now let's look at the abstract electronic sound sources.

Years back I said that throwing a piano through the air isn't viable because it's a physical contradiction. I was laughed at at the big composers' forum but I'm still firm in my belief.

As soon as we have a visual reference to the sounding object as long as it's an instrument, it would seem ridiculous to send it to the back speakers on its own journey.

BUT when we're talking abstract sound, sounds never heard before it's a completely different ball game.

Now we're entering the sound *field* meaning that the sounds used in the composition will all be part of a virtual acoustical texture that lends itself to a layer of different rooms all happening at the same time.

In my electronic compositions from the past ten years I have come to dub this technique *double exposure virtual acoustics*.

In essence it's a very straightforward technique, much more simple than one would realise. In short it's about recording the different sound objects used in the composition in *different* acoustical virtual rooms. Say one sound with short reverb, the other sound with completely different room size and reverb time/filter.

Without dwelling too much into the effect on the listener one could say that given simultaneous acoustical rooms are heard, the listener can't get his bearing since in our physical world we only can be in one acoustical place at a time. The effect is something different than width, rather it gives us a sensation of depth.

Needless to say this technique is not applicable with success on melodic music where different instruments would be given their own room since that would be a contradiction to our perception of musicians playing together being close to each other.

The sound objects themselves can also be carriers of an immense wealth of information.

Take the example when you are standing and a chopper will land on a helicopter pad. The turning of the body will give you a sound sensation of movement since for example the exhaust pipes of the engine will be directed directly towards you with a shift to higher frequencies. The blades will make the same type of change where the filtering will be together with the phase angles (time delay between both your ears) a source for your understanding about its position - without you thinking about it.

On my Synclavier I have made certain audible changes which emulates the filtering by using FM modulation and strangely enough this alone will give you a sensation of an object in motion on its own axis. We are not talking Doppler fx here, rather the ballerina whirling on her toes !

So in short the sound *field* notion could contain

### **Depth sensation with double exposure virtual acoustics**

**Movement of a unique object on its *own* axis ( not to be confused with panning or movement on a horizontal axis)**

**Frequency low to highs**

**Horizontal panning**

**Stereo width**

**Filtering as a means of giving the distance ( make the visual comparison to a mountain range in front of the other, color of closest is more bright than mountain range farther away).**

**Live intervention during concert via mixing console with great number of speakers available for the composer's interpretation.**

## Presentation forms

I have here outlined some differences between an electronic music based on sound sources which are abstract and usually without discernible pitch, and the melodic acoustic music.

To me live electronics should take advantage of the acoustical qualities inherent in electronic sound.

I find it hard to see an interpreter on stage somewhat lost in space however well written the piece is. The sounds prerecorded or obtained via manipulation in real time will still be relayed to the audience via speakers.

One solution would be to have the instrument's sound as close as possible to the interpreter in order to maintain the origin of the sound source. I might be the only one on this planet finding this a problem, but most live music I've so far heard has been dealing with the technology as an end in itself, leaving you with unaccomplished composition which hasn't made use of the sound field possibilities.

The other one that comes to mind is a setup where the composer is in the middle of the audience, controlling the sound space and the manipulations required for the interpreter(s). This could be seen in Stockhausen's Kontakte and Sieben Tage aus Licht.

Where should the audience look ? How should they be seated ?

In American university setups the octophonic compositions usually calls for an audience sitting in a circle. But this means that everybody will have their own "sweet spot". Besides the understanding of the field - the complete sounding universe that is available in octophony - is often destroyed by a punctual interjection of sound from one speaker protruding space without leaving a tail or refraction/reflection in the other adjacent speakers. Whoaaahh Awful !

When I played my Crushing Silence (2013) at the New York Electronic Music Festival 2014 in New York City I had to make the audience sitting in a circle, all rotate their seats in order to all look in the same direction. Reason - because that's how I mixed the composition and without this seating important details in the composition would be lost to the audience.

What I've been trying to convey here is the difficulty in finding what I see as a convincing setup when giving concerts with electronic music.

The fixed media piece can be heard in a black box and with good sound field results (depth, width, speakers placed closer and farther away on the same axis et al.)

My problem is when the interpreter playing cello clarinet or even worse piano which is sounding via speakers contradict my notion of the instrument. Am I old, will I overcome this feeling ?

Don't know but it's hard to see your car suddenly sounding like a woodpecker ? You'd say something is wrong.

BUT

if I'd see an interpreter use batons, sticks and hammer away on an object and I'd hear the sounds from a speaker - I'd buy that. I think because I have no notion of an instrument, I have no reference to the "thing" the interpreter is hammering away on.

In my current project with visual artist Tobias Rylander we have come to deal with the same question as to how to seat the audience in order to maintain the perfect acoustical rendering of the composition. Here the problem is also if the audience seated in the back should see the necks of the people in front....

My take is that with the sound source/sound wall as in orchestral music, the sax in the rock group all sounds are emanating from one visible direction and a direct link to the references we hold to the playing of the instruments - we see the instrumentalists all play and as a result we have a sound.

In live electronics the contradiction lies in the fact that the music isn't as direct and full of power as in orchestral or rock music, hence leaving us with a small instrument sounding as bigger than we observe. I might be wrong but that's the only way I can explain it.

Until I've found a way to make an audience be fully aware of the music, without no itching feeling that makes you say I'm glad I heard it because I won't need it a second time

I'll stay out of live electronics.

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Ragnar Grippe

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Some works using double exposure virtual acoustics

Crushing Silence (2013) stereo and 5.1

the C E L L I S T (2014) stereo

Lumière Etrange (2015) stereo

Cold Numbers (2011) stereo and 5.1

Ligne de Faille (2015) stereo

<http://www.kinanazmeh.com>

<http://sevendesignworks.com/tobias-g-rylander/>