

Experimental hemisphere surround sound live composition with newly created colored noises for KUBUS(The Blue Cube) at ZKM.

Completed and **experimental performance** at ZKM as artist in residence during January 2010.

Dedicated to Jan W. Morthenson for the occasion of his 70th birthday.

Brief Introduction:

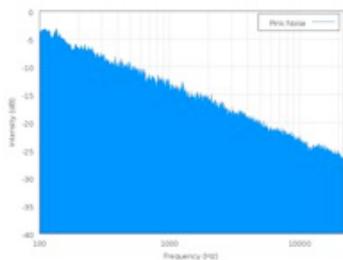
THE WORLD OF COLOR

- an experimental site-specific composition with new colored noises for KUBUS(The Blue Cube) at ZKM.

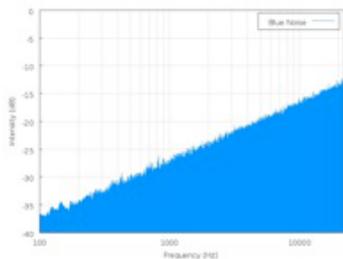
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COLORED NOISES

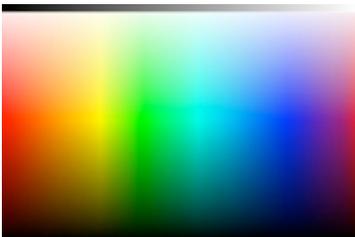
FS 1037C Telecommunications Glossary defines four “colored” noises according to different characteristics of power spectral density (PSD) of the frequency domain: white noise, pink noise, blue noise and black noise. Those color names are derived from an analogy between the spectrum of sound waves and the equivalent spectrum of light waves. For example the blue noise that is defined such that its power density increases 3dB per octave with increasing frequency is equivalent to blue light that is located in high frequency area in visible light spectrum. While the pink noise that has power density decreasing 3dB per octave with increasing frequency is equivalent to red light that can be found at the lowest visible light spectrum. (refer to the pictures below.) Black noise is silence as no light.



Pink noise spectrum



Blue noise spectrum



Visible light spectrum low (left) to high(right) frequency

There exist the other colored noises that are defined unofficially:red noise, violet noise and grey noise. They are also based on the above analogy between light wave and sound wave. However green and yellow (orange) noises are named rather differently in terms of context in which they are used and that results into multiple definitions. For example, green noise is defined as environmental acoustic noise among soundscapers.

AUDITORY PERCEPTION WITH COLORED NOISES

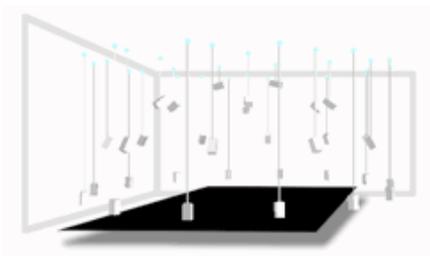
The analogy between the defined colored noises and visible colored lights are based on simple physical analogy as described above. However this simple physical analogy is in question when considering both sensory perception and psychological affection which play important roll for defining sound perception. Does audible perception of the blue noise that FS 1037C defines really invoke blue light for us? Does similar psychological affections occur between them? Let us question in another

way. Can we perceive the same kind of psychological sensation between mixed colored lights and mixed colored noises that FS 1037C defines? We know what color appear while mixing each light spectrum. What happens if you mix two or more colored noises? What do you perceive?

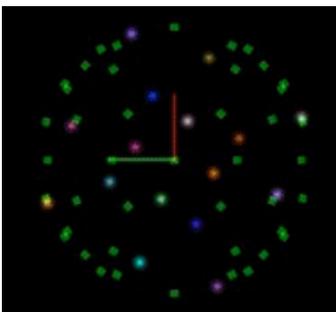
EXPERIMENTAL COMPOSITION

The World of Color is an experimental hemispherical surround sound composition that experiments on realtime performing various mixture of colored noises that are recreated by the composer who at the same time also moves each colored noise in the specific three dimensional space.

Colored noises of blue, red, green and yellow are re-synthesized through process of subtraction from white noise using band pass filters according to mathematical formula the composer set. The each new colored noise are initially disposed in the sphere/surround Klangdom, the unique concert space with 39 channels of loudspeakers at ZKM, Center for Art and Media Karlsruhe in Germany by means of Zirkonium, the in-house developed panning software with which the composer is able to construct movement of noises during performing live. The “film” color defined by David Katz’ The World of Color from which the title of the composition was derived would be applied to noise (sound) domain and experimented . The composer moves colored noises inside the space and blends them experimentally in various combinations in order to produce other extra colors and gradation between them. During the mixing process vibration or “flickering” of noises is as well experimented.



Klangdom with loudspeakers



Panning in Zirkonium

Duration: 47'47" (= 2848" that is temperature of 2848 k of incandescent bulb light)