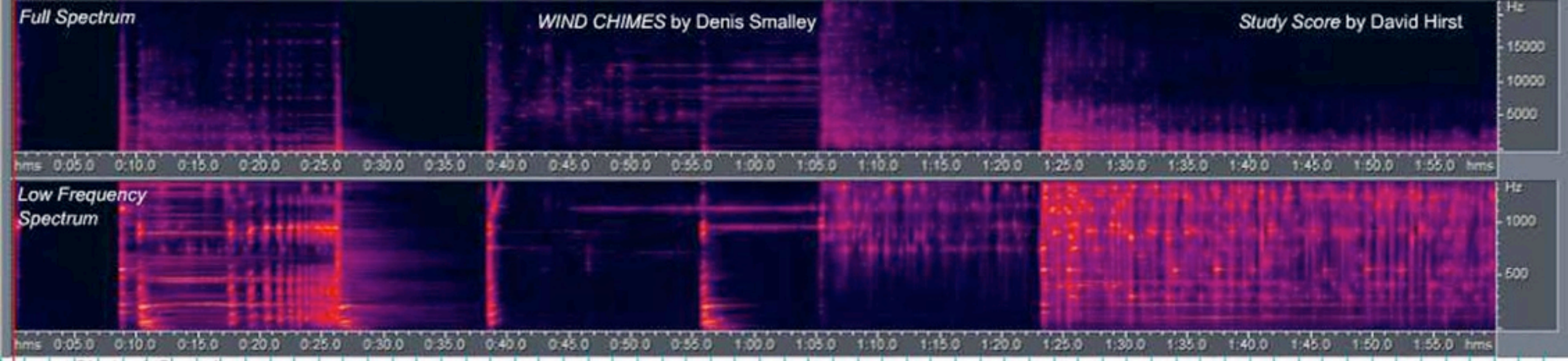
Analysis of Denis Smalley's Wind Chimes

by David Hirst

These are screenshots meant to accompany the Analysis of Denis Smalley's Wind Chimes by David Hirst on OREMA

First there are 8 'annotated study score' screens that represent every 2 minutes duration of the piece.

Then there are 4 'short score' screens representing every 4 minutes duration.



Playback Controls

Section 1

1016Hz (B5+50)
959Hz (A#5+50)
Compound perc. chime

Many high tinkling chimes
0:10.32

(B3+2)
Very Low Choof
0:10.10

(A#+48)
Compound Gong - Partials held through
0:08.62

Struck piano frame
(A#1+43)

Low Bass Hum
0:26.36
(A#3+50 or D#1+42)

Section 2

Beats of close partials, eg. 5998, 5908 Hz or F#+22, F#-3 = quarter tone difference

Melody of higher partials: 5-8 kHz

1120 Hz (C#6+17)
Sustained tone

Sweep up in HF components
1105 - 1502 Hz
Compound low klunk

Compound sound -
1. Low Choof

2. HF components - 952 Hz (A#5+36)
2013 Hz (B6+32) + colourations above 5 kHz
0:55.56

3. Pitch component:
240 Hz (A#+50)

Section 3

Many chimes in upper spectrum > 800 Hz

2989 Hz (F#7+17) rings on
1:05.17

Many pitches & attacks then fade

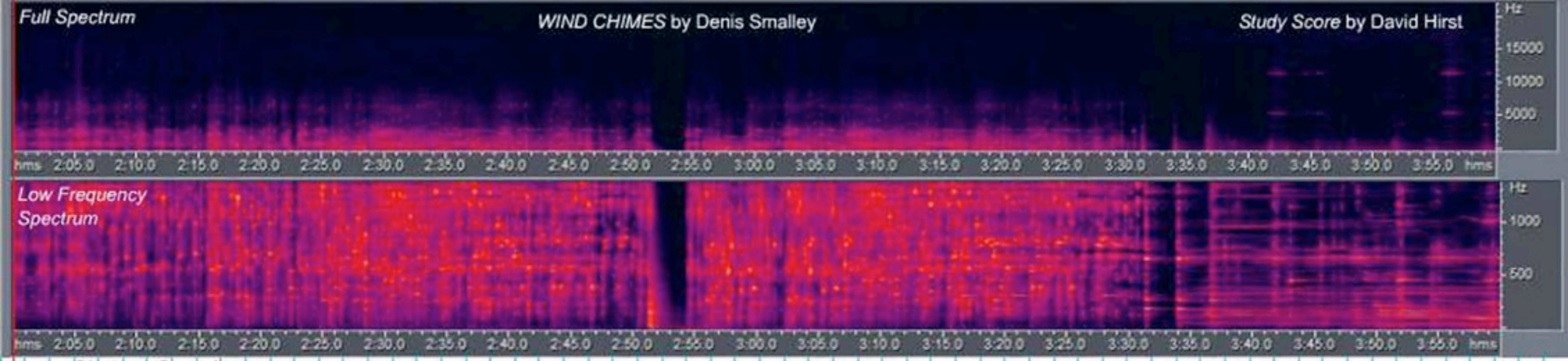
Gong-like attack

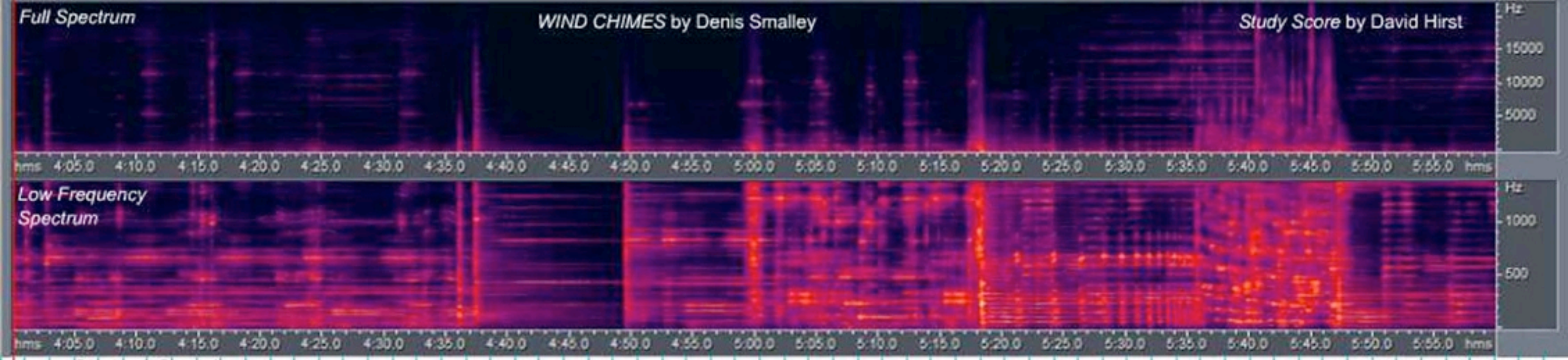
Compound Event
1:22.87

318 Hz (D#4+38)
247 Hz (B3+2)
134 Hz (C3+43)
Continuos spectral components -

Low chime sounds (Angklung?)

Processed chimes
1:55.48


Full Spectrum
WIND CHIMES by Denis Smalley
Study Score by David Hirst
Hz
15000
10000
5000
hms 2:05.0 2:10.0 2:15.0 2:20.0 2:25.0 2:30.0 2:35.0 2:40.0 2:45.0 2:50.0 2:55.0 3:00.0 3:05.0 3:10.0 3:15.0 3:20.0 3:25.0 3:30.0 3:35.0 3:40.0 3:45.0 3:50.0 3:55.0 hms
Low Frequency Spectrum
Hz
1000
500
hms 2:05.0 2:10.0 2:15.0 2:20.0 2:25.0 2:30.0 2:35.0 2:40.0 2:45.0 2:50.0 2:55.0 3:00.0 3:05.0 3:10.0 3:15.0 3:20.0 3:25.0 3:30.0 3:35.0 3:40.0 3:45.0 3:50.0 3:55.0 hms
Playback Controls
Section 3 - Cont'd
Spectral components
Anklung
Processed chimes - scratchy HF components (2568 Hz)
Figures of 2's & 3's
2:28.62
2:50.13
A
2:03.00
Amplitude Modulated Anklung Sounds as background
(Granulated & filtered)
Muffled Bass Drum
2:51.00
2:54.20
3:06.94
3:29.16
A'
Almost literal repetition of A
Bell-like sounds enter gradually getting louder
806.5 Hz (G5+48)
Recirculating these pitches
| Section 4
3:52.14
Ice
4156 Hz
3:41.41
3:55.44
HF triplets & duplets
peaks - 11380 Hz + 5670 Hz
Bell sound
3:33.82
664.5 Hz (E5+13)
Clay Bowl
3:41.41
464 (A#4-5)
286 (D4-46)
3:51.49
234 (A#3+9)
3:58.41
Smeared amp & Freq
Soft Anklung
3:37.46
3:45.01
3:54.18
LF components added, eg.
183.7 (F#3-12)
149.7 (D3+33)
2483 (D#7-4)
1763 (A6+3)
Low bell-tree chord
766 (F#5+60)
3:36.36
Components ring on



Playback Controls

Ice
4142
Hz
4:08.37
4:14.01
Var. with
HF
accent
4:24.52
4:10.33
4:17.70
4:31.18
4:33.18
HF triplets & duplets
peaks - 11380 Hz + 5670 Hz

Clay Bowl
Variation with gliss down
4:02.49
Orig. sound
down m6
(E5+23)
(D#-14)
4:15.74
Orig. sound
+ 43 cents
(C6-7)
(B5-7)
Muted
piano
cluster
4:35.80
4:20.28
Rubbed glass rim
Variation on "Ice"

LF components
added, eg.
183.7 (F#3-12)
149.7 (D3+33)

2483 (D#7-4)
Low bell-
tree chord
1763 (A6+3)
766 (F#5+60)
Components ring on

4:37.21
Cluster + low bell
tree from near start?
Bell/clay bowl decay lingers

| Section 5
Repeated
HF peaks
7124 Hz
4938
3180
Duplet
4:58.80
HF
Triplet

4:59.47
Broadband
vocal noise

Peak 830 Hz
(G#5-1)
5:00.36
Metallic anklung
Bandlimited noise
Processed anklung

Struck
piano
frame
4:49.54
4:53.78
Low gong
232 &185 Hz
Double
thuds - low

5:05.39
LF motive
247 Hz
Sustained
132 Hz

HF
Quadruplet
Noise gliss down
Whispering glass rim -
wide spaced HFs
Whispering HF
repeated
5:48.36

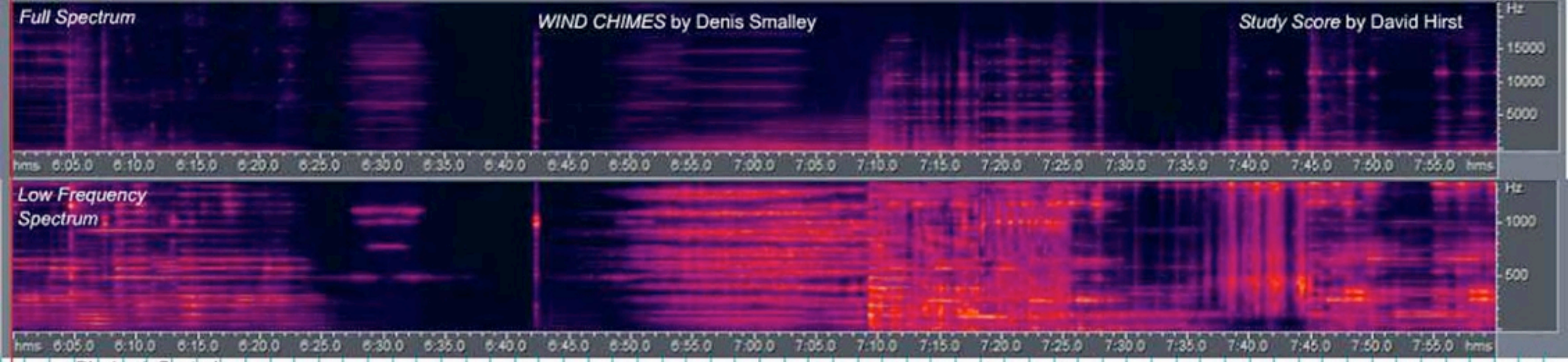
5:20.90
Low choof accelerando
5:17.22
Plucked string
gliss up

Plucked
bass
string
Sustained
85 Hz & 681 Hz
(E+50)
Tonality

5:35.57
Dense spectrum
many events
"Smeared" by
processing -
see notes

Resonating harmonics = "Ghost" components

5:47.07
Struck piano attack
with buzzing
sustained dyad
(G#2+36)&(E3-12)

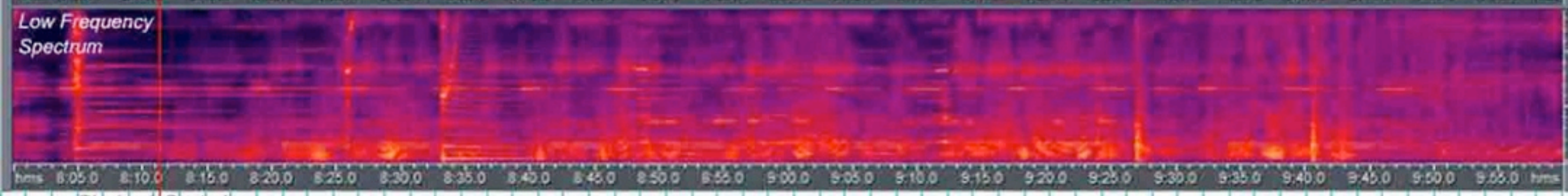

Full Spectrum
WIND CHIMES by Denis Smalley
Study Score by David Hirst
Hz
15000
10000
5000
hms 6:05.0 6:10.0 6:15.0 6:20.0 6:25.0 6:30.0 6:35.0 6:40.0 6:45.0 6:50.0 6:55.0 7:00.0 7:05.0 7:10.0 7:15.0 7:20.0 7:25.0 7:30.0 7:35.0 7:40.0 7:45.0 7:50.0 7:55.0 hms
Low Frequency Spectrum
Hz
1000
500
hms 6:05.0 6:10.0 6:15.0 6:20.0 6:25.0 6:30.0 6:35.0 6:40.0 6:45.0 6:50.0 6:55.0 7:00.0 7:05.0 7:10.0 7:15.0 7:20.0 7:25.0 7:30.0 7:35.0 7:40.0 7:45.0 7:50.0 7:55.0 hms
Playback Controls
Whispering HF
Original percussive chime
6:04.47
High cymbal 1148 Hz (D6-39)
Continuent of high chimes
6:21.13
Tinkling chimes
Selected frequencies sustained
eg. 923 Hz (B5-17)
6:12.58
Anklung sound
6:07.96
6:15.16
Cymbal "Ghost" components
Buzzing sustained dyad (G#2+36)&(E3-12)
6:23.04
Glass rim chordal "Chorale"
| Section 6
6:43.84
Glass rim chordal "Chorale"
6:42.06
Original + 45 cents 1043 Hz (C6-1)
985 Hz (B5-5)
1987 Hz (B6+9) rings on
6:48.79
Denser spectrum with very high freq components eg. 2217 Hz (C#7)
6:58.39
Trumpet-like spectrum 2020 Hz (B6+39)
7:10.10
Single Anklung 402 Hz (D4+42)
7:10.71
HF duplets & triplets 10104 & 11347 Hz
Choofs mixed over each other
7:12.71
7:16.53
| Section 7
Echo of HF duplets
Scraping broad-band noise with filter sweeps
7:35.01
HF triplets 11500 Hz 5600 Hz
7:57.20
Modified bells
Soft bells
Scraped metal
7:54.60
Amp. modulated
7:43.77
Metal Anklung
Higher sustained component
7:55.82
Tremolo 7th component 294 Hz (D4)
7:14.04
7:22.17
7:25.85
7:46.18
(D4)
7:10.90
Bass vocal 481 Hz (A#4+52)
Very low sustained sound
190 (F#3+46)
156 (D#3)
81 (D#2+70)
(D#5+32)
(D5+31)
7:51.35
Gong 1
7:09.22
Plucked bass string
84 (E2+25) & 499 (B4+16)
7:25.84

Full Spectrum

WIND CHIMES by Denis Smalley

Study Score by David Hirst

Low Frequency Spectrum



Playback Controls

8:04.21 Scraping noise

8:15.48 Glass rim - High freq components

8:47.80 Bowed glass

3300 Hz

Bowed metal
841 Hz (G#5+22)

1650 Hz

9:20.86 Pitch glide to 1605 Hz (G6+40)

9:45.30 Bandpass filtered noise.
Bands are ~ 600 Hz wide
Becoming modulated

HF triplets & duplets (cont'd)

8:11.06

8:26.00

8:33.47

8:46.88

8:56.48

9:10.04

9:24.83

9:39.39

9:46.78

9:58.33 Chimes ring through

8:04.81 656 Hz (E5-9)
466 Hz (A#4)
Scraped metal (Cont'd)
Gong 2

8:25.70 Plucked string, upward gliss
820 Hz (G#5-20)
8:33.16
608 Hz (D#5-39)

9:26.81 Drum or footstomp

9:40.46

8:18.80 Scrabbling low sounds, bands of freqs 200-1600 Hz, filtered periodically

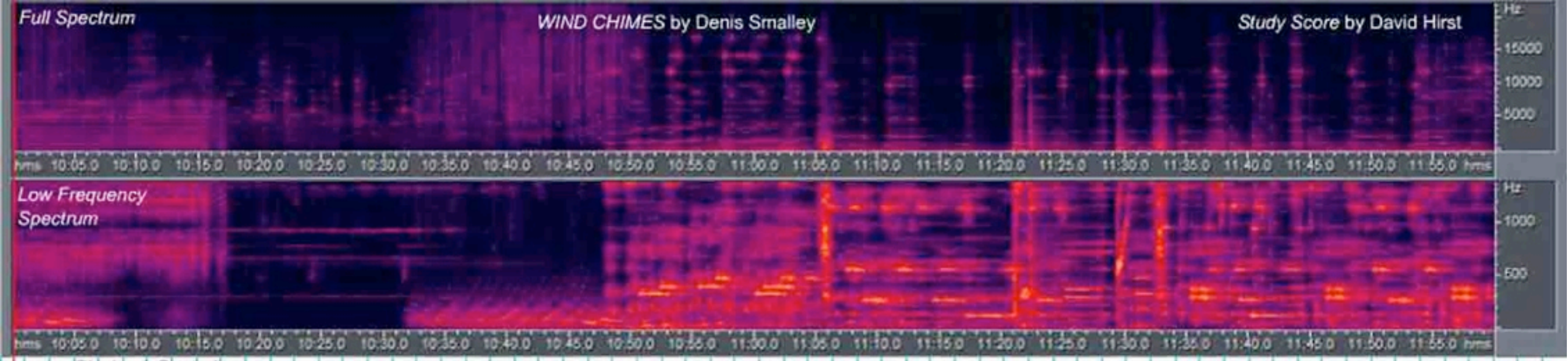
9:27.27 11 varying filter bands

Higher sustained component (Cont'd), 668 Hz (E5+23)

8:33.16 Low Bass sound
55.8 Hz (A1+25)
50.5 Hz (G1+51)

Gong 1 (Cont'd)
151 Hz (D3+48)
78.7 Hz (D#2+20)

Filtered low freqs (< 300 Hz) create ascending melodic motives



Playback Controls

10:18.57 Short chirping

4500, 5211, 5400, 6100, & 4900 Hz etc

Bandpass filtered noise.
Bands are ~ 600 Hz wide
- modulated at varying rates

Chimes ring through
2252 Hz (C#7+27)
920 Hz (A#5-23)
658 Hz (D#5+96)
318 Hz (D#4+38)

10:31.92

Filtered low freqs (< 300 Hz) create ascending / descending melodic motives

10:40.00 Bird whistles

Range 1200-3000 Hz

10:47.82 Antiphonal HF triplets, granulated with variable AM

1958 Hz (B6-15)
1628 Hz (G#6-34)
1383 Hz (F6-16)

11:05.05 Scraping noise

1958 Hz (B6-15)
1628 Hz (G#6-34)
1383 Hz (F6-16)

10:50.79 Antiphonal HF triplets, this part doubles the motive below

HF duplet

11:29.33 String gliss

Up & down

11:32.31 Scraping noise

11:20.87 Struck piano frame

11:33.09 String gliss up 586 Hz (D5-2)

Metallic Anklung
951 Hz (A#5+34)
785 Hz (G5)

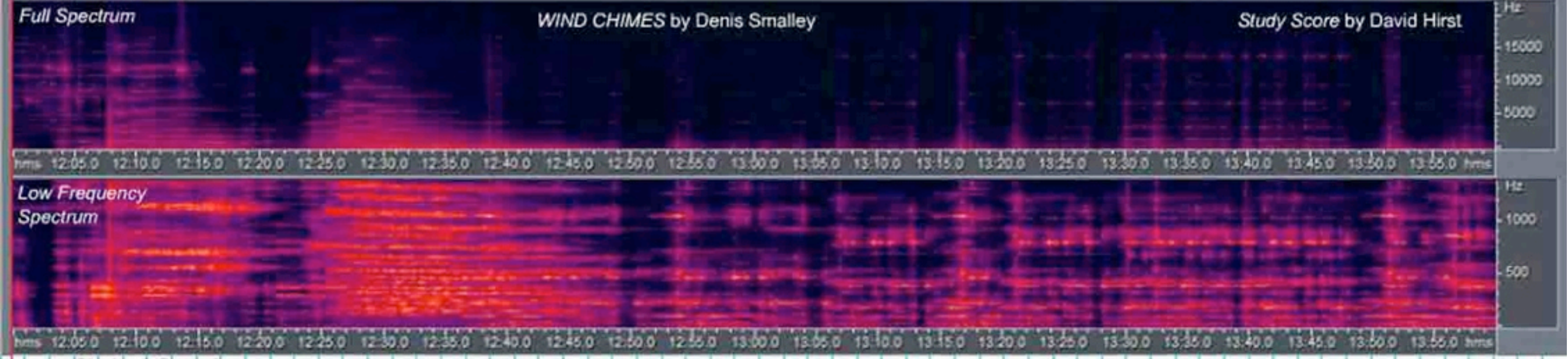
High chimes

11:54.71

11:05.86 Complex mix of low & high freqs, organ+HF triplets+AM, centred on C#, some beats

10:50.79 Organ-like 3 note motive

490 Hz (B4-12)
411 Hz (G#4-18)
345 Hz (F4-18)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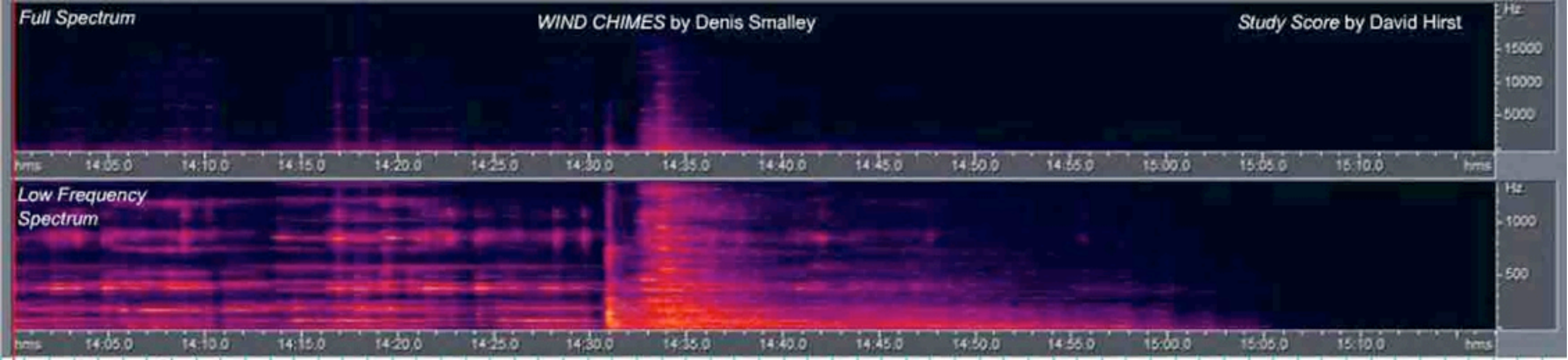
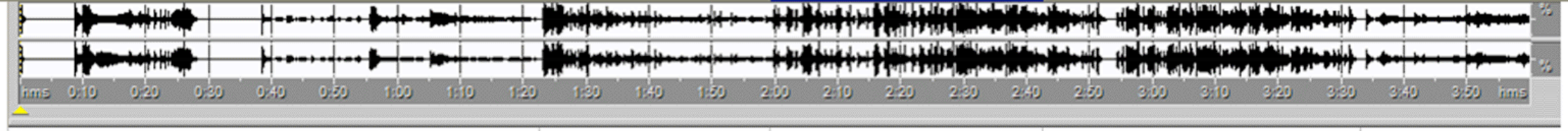
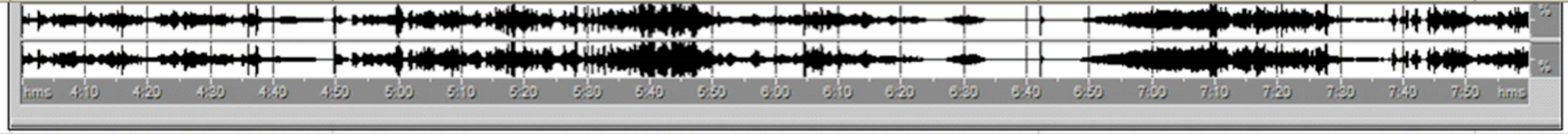
Low Frequency Spectrum
Hz
1000
500
hms 12:05.0 12:10.0 12:15.0 12:20.0 12:25.0 12:30.0 12:35.0 12:40.0 12:45.0 12:50.0 12:55.0 13:00.0 13:05.0 13:10.0 13:15.0 13:20.0 13:25.0 13:30.0 13:35.0 13:40.0 13:45.0 13:50.0 13:55.0 hms
Playback Controls
Bowed Glass
12:38.26
Bowed Metal
2079 Hz (C7-11)
1039 Hz (C6-11)
(C6-11)
High chimes (Cont'd)
12:07.70
12:52.73
Bowed Cymbal
13:48.95
13:29.20
1737 Hz (A6-23)
13:06.10
868.3 Hz (A5-23)
13:20.00
868 Hz beats with 752 Hz (G5-72)
13:54.27
Lower Bowed Cymbal
Complex mix (Cont'd)
12:50.00
Low sustained gong
Pitch is variable from 238 Hz (A#3+39) to 197.4 Hz (G3+12)
1131 Hz (C#6+34)
714 Hz (F5+38)
567 Hz (C#5+40)
AM Rate
12:08.37
Wurlizer Organ Chord
868 Hz (G#5+77)
673 Hz (E5+37)
546 Hz (C#5-24)
AM Rate
12:23.55
Richer chord with staggered pitch entries
Variable vibrato rate increases

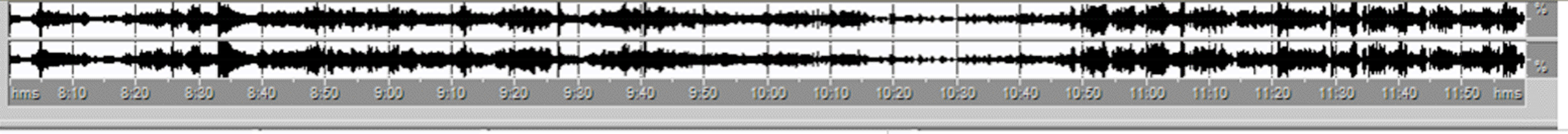

Full Spectrum
WIND CHIMES by Denis Smalley
Study Score by David Hirst
Hz
15000
10000
5000
hms
14:05.0
14:10.0
14:15.0
14:20.0
14:25.0
14:30.0
14:35.0
14:40.0
14:45.0
14:50.0
14:55.0
15:00.0
15:05.0
15:10.0
Low Frequency Spectrum
1000
500
Playback Controls
14:01.25
1737 Hz (A6-23)
868.3 Hz (A5-23)
14:13.79
14:23.89
Lower Bowed Cymbal
Low sustained gong (Cont'd)
14:32.70
Complex organ/HF triplet mixture
Low plucked string
14:30.88
Low frequency rumble



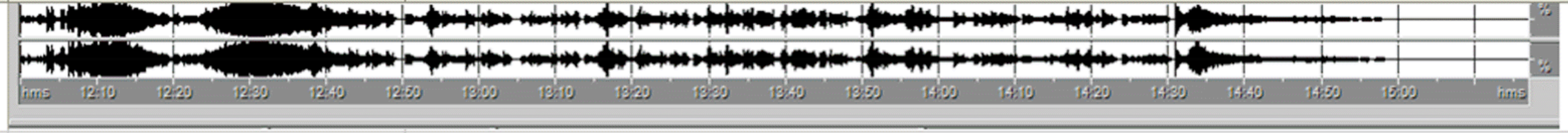
Section	Sections 1&2	Section 3			Section 4
Sub-Section		Episode 1	Episode 2	Episode 3	
Texture	Attack-continuant model	"Spectrally pitched" attack-continuant	Spectrally dense & rhythmic	Drum punctuation announces this dense & rhythmic episode	Scaffolding & triggering sounds used over sustained sounds
Frequency Organisation	Pitch centricity: (A#+50)	Pitch centricity: B		Pseudo cadence G-E	"Spectral harmony"
Time Organisation			"Spectral motives" of HF rhythmic patterns	Almost literal repetition of "Spectral motives"	Elaborated HF rhythmic motives
Special Features	Opening compound chime sound, contrasting low choofs				Bell sound used for punctuation
Semantic vs Syntactic	Mostly untreated sounds		Increased use of processing		Scaffolding sounds are the original sound transposed



Section	Section 4 (Cont'd)	Section 5	Section 6	Section 7
Sub-Section				
Texture	"Timbral counterpoint"	Attack-continuant framework; Point of attraction	Compression-relaxation style; Begins to overlap with next section	
Frequency Organisation	"Spectral harmony"	Pitch centricity: B-E-Pseudo E7 chord-B; Segmentation of spectrum into different tessitura as sound density increases; "Spectral Chorale" at end of section	Pitch centricity: B-C#-B-E-E7-E/D# + colourations; "Spectral Chorale" from previous section extended	
Time Organisation		Rhynthmic figures; Repetition used: accelerating choofs, pre-echo of anticipated sound, ghost components, repetition in a new context, return of strategic sounds	Short-term rhythmic elements: mixed accelerating choofs, regular bell sounds; Long-term elements: explosion of activity, long sustained sounds, compression-relaxation schema; point of explosion at 7:09.22	
Special Features		Compound sounds and compound gestures used	Re-use of previous material - transformed & mixed; more compound sound objects	
Semantic vs Syntactic		Low choofs again	Original compound chime sound returns at a critical juncture in the work	



Section	Section 7 (Cont'd)	Section 8
Sub-Section		
Texture	Overlapping phrases on a bass pedal	Succession of 4 phrases. The 3rd phrase is a complex drone punctuated by compund percussive events
Frequency Organisation	Pitch centricity: D/D#/E; Full use of spectrum: Low-bass pedal, Medium-timbrel interest through extensive filtering, High-rhythmic interest	Different motives in different frequency registers: "Diminished triad" of F-G#-B, Three pitch motive C#-E/E#-G#, "Spectral counterpoint" in the upper frequency register; Pitch centricity: C# predominates
Time Organisation	Compund attack-continuant sounds; HF duplets & triplets create a call-response rhythmic interplay with bowed metal-bowed glass sounds; Footstomp denotes start of the "climax" of signal processing (exotic filtering) at 9:26.81	Bowed metal-bowed glass dialog; Percussive sounds used as punctuation to "initiate" each phrase; Scraping noise used to "trigger" continuous sounds
Special Features		
Semantic vs Syntactic	Re-use of earlier sounds, but with increased processing	Re-use of previous material, but even more signal transformation present



Section	Section 8 (Cont'd)	Section 9
Sub-Section		
Texture		Coda: Variations on a "timbral theme"; The low gong acts as a "timbral cantus firmus"
Frequency Organisation		Pitch centricity: G/A/A#; Full use of spectrum
Time Organisation		Timbrel interplay: bowed metal-bowed glass interplay is continued from the previous section, but transposed to a sequence of C-A; Plucked string sound is another point of punctuation, introducing the organ-like flourish near the end
Special Features		
Semantic & Syntactic		Winding down of the work with familiar sounds that have less processing than previous sections