st101.1.42

sumtone

:

michael edwards

tramontana

for viola and computer

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programme note:

Tramontana was written mainly in September 2002 in the Villa Serbelloni of the Rockefeller Foundation (Bellagio, Italy) shortly before I moved to Edinburgh after a five-year stay in Austria. The title is from a Eugenio Montale poem that refers to a stark, cold, northerly wind coming from the mountains.

The piece has three sound sources: 1) a live amplified viola, tuned so that the first three strings have a harmonic that is exactly in tune with the seventh partial of the fourth string; 2) 4-channel sound files made from samples of a recording of the viola part; and 3) live processing of the viola using Max/MSP and a C programme I wrote for live granular synthesis with transposition. The version for first performance with the Experimentalstudio Freiburg included grains circulated around the audience in eight channels using their Halaphone hard/software.

The instrumental and sample-processing parts of the piece were created with my *slippery chicken* algorithmic composition software (written in Common Lisp). Of significance here is the close structural relationship between the two parts, particularly the quasi-instrumental listening experience that the sound files produce. This often goes so far as to make the live viola and sound files indistinguishable. It is my goal in such pieces to create a sound world in which neither the instrumental nor the electronic sounds dominate, rather, each one supports and extends the other. This is achieved here insofar as the same computational processes are used to generate both layers (in *Tramontana* mostly permutation and "tendency producing" algorithms). It is a feature of *slippery chicken* that once the data for a piece is produced in computer memory (in an abstract and output-media independent format), the programme can generate from the same data scores using the programme Common Music Notation (CMN), sound files using Common Lisp Music (CLM), and MIDI files using Common Music (CM).

For CLM and CMN I am, as always, grateful to Bill Schottstaedt of Stanford University; for CM to Rick Taube. For several tips and suggestions I'm obliged to the violist who gave the premiere in Darmstadt on August 12th 2004: Barbara Maurer.

Tramontana wurde hauptsächlich im September 2002 in der Villa Serbelloni der Rockefeller Foundation (Bellagio, Italien) geschrieben, kurz bevor ich nach einem fünfjährigen Aufenthalt in Österreich nach Edinburgh zog. Der Titel stammt von einem Gedicht Eugenio Montales und bezeichnet einen starken, kalten Nordwind.

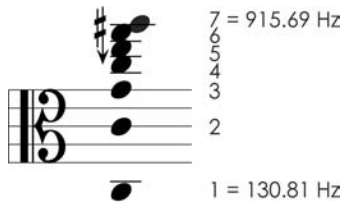
Das Stück besteht aus drei Klangquellen: Zum einen die live gespielte Bratsche, die verstärkt und so gestimmt ist, dass die ersten drei Saiten ein Flageolet bilden, das mit dem siebten Teilton der vierten Saite übereinstimmt. Zum anderen Computer-Klangdateien, deren Ausgangsmaterialien (Samples) von einer zuvor aufgenommenen Version der Bratschenstimme stammen sowie die Live-Bearbeitung der Bratschenstimme mit dem Programm Max/MSP und hier insbesondere mit einem von mir in C geschriebenen MSP Objekt für Granular-Synthese mit Transposition. Die Grains von der Live-Granular-Synthese werden in dieser Aufführung mit dem vom Experimentalstudio entwickelten Halaphon verräumlicht.

Der Instrumental- sowie der Sample-Bearbeitungsteil des Stückes wurde mit meinem in Common Lisp geschriebenen Algorithmischen Kompositionsprogramm "slippery chicken" entwickelt. Signifikant daran ist der enge strukturelle Zusammenhang zwischen diesen zwei Teilen und besonders das quasi instrumentale Hörerleben, das die Klangdateien hervorrufen. Dies geht so weit, dass die live-instrumentalen und elektronischen Teile oft ununterscheidbar sind. Mein Ziel ist es tatsächlich in solchen Stücken, eine Klangwelt zu schaffen, in der weder der Instrumental- noch der Elektronikteil dominiert, sondern beide das jeweils Andere unterstützen und erweitern. Dies kann erreicht werden, indem die gleichen Prozesse (in *Tramontana* meistens Permutationen und Tendenzen erzeugende Algorithmen) zur Erstellung beider Teile angewendet werden: Nachdem in einem abstrakten Format die Software des Stücks fertig ist, kann das Programm die Partitur mittels Common Music Notation (CMN) schreiben und mittels Common Lisp Music (CLM) und den Samples die Klangdateien erzeugen.

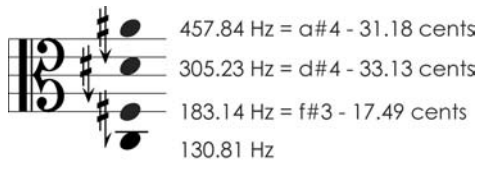
Für CMN und CLM bin ich, wie immer, Bill Schottstaedt von der Stanford University dankbar. Für technischer Unterstützung in Freiburg bin ich den Mitarbeitern und Andr Richard, dem Leiter des Experimentalstudios, dankbar. Für sämtliche Anregungen und Lösungen danke ich auch Barbara Maurer.

performance directions

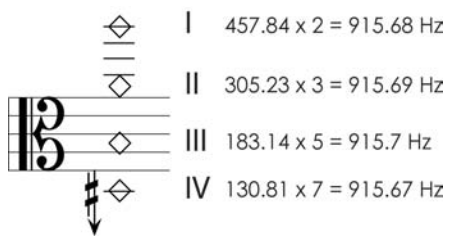
The strings of the viola are tuned so that all strings provide harmonics at the frequency of the 7th partial of the C-string (see next page for microtone symbols):



In order to achieve this, the strings should be tuned as follows:



The following harmonics, then, all result in the same frequency, i.e. 915.69 Hz, the 7th partial of C3 (all numbers rounded to 2 decimal places hence slight deviations), meaning that these can be used to tune the strings "by ear" relative to this 7th partial:



When these notes (as diamonds) appear in the viola part, the string is implied and the resultant pitch is always the same. (The exact fingering position for the C-string harmonic is approximate.)

Although this tuning creates pitches difficult to notate, there are no microtonal fingerings involved in the piece; rather, it is the *sounding* pitches, and in particular, harmonics, that are microtonal as a result of the scordatura. The sounding pitches are indicated in the score (from bar 222 onwards) as approximations to the nearest 12th tone (as above also) on a smaller staff above the viola staff. All pitches given in the viola part are therefore fingered, not sounding, pitches.

The tempi given in the second section (bar 222 onwards) are to be seen as ideals. Each tempo could be reduced by 6 or 10 (but not lower than this). The timeline under the computer part uses the slowest tempo. This of course does not affect or imply anything about the live performance.

electronics

essential equipment:

- computer running MAX/MSP
- multi-channel sound card (minimum 2 channels mic/line-in, 8 channels line-out–4 channel version possible if 8→4 mixdown performed in soft or hardware)
- 16-channel MIDI faders connected to the computer (8 possible with some re-programming of MAX)
- one overheard condenser microphone and one clip-on for the viola
- eight (or four) loudspeakers distributed around the audience as follows:

  1 2
  3 4
  5 6
  7 8

viola signal

The viola should be very significantly amplified so that all very quiet sounds are clearly audible and present. The effect should not be one of "transparent" amplification, rather the sound should be very "electric". Judicious mixing of the clip-on and air mikes should be made in order to find a compromise between sound quality and amplification power. Compression of the viola signal is highly recommended for both amplification and processing purposes; this is left up to the computer performer to organise i.e. it is not built into the Max/MSP patch. A small amount of reverberation may also be added to the viola signal if deemed necessary; this should, however, be as transparent as possible. Levels for the live viola may be controlled directly from Max/MSP and/or from a mixing desk.

computer layers

Essentially, the computer is used to trigger the playing of two overlapping streams of 4-channel sound files and to process the live viola in real time: trigger points change the parameters of two alternating layers of granular synthesis (amplitude controlled by the same fader) and one "triple-looper" (three loops in pre-programmed proportional relationships, always triggered together and in general to be controlled only as a group). The sound file layers are carefully constructed to allow flexibility of timing and tempo in the viola part: the two layers do not have to be exactly correlated, rather, triggering at the points indicated in the score will create the correct entry and exit event levels (most exit with a slow fadeout even if they may enter with an attack).

score interpretation

A blue arrow in the score indicates a trigger point in the computer part (see "key to symbols" below for more details). The intended output audio level (all sound file and live processes combined) is displayed on the dashed-line staff below the viola part. This is an RMS loudness curve that corresponds with the viola part (i.e. the two parts are vertically aligned). There are six lines (including the bottom timeline) providing five areas which could be thought of as dynamics/loudnesses of *piano* and below, *mp*, *mf*, *f*, and *ff*.

levels

It should be noted that although a fairly complex and exactly pre-programmed series of parameter changes is stepped through in the computer throughout the piece, the control over the individual levels of these processes is left to the judgement of the computer performer. Although a specific process may be indicated in the score, it is not always necessary or desirable to have that process clearly audible at that point—it could be brought in later. The notation of a starting process could be seen as an invitation to carefully, quietly, and slowly explore what's "under the fader" at that point i.e. starting at zero amplitude. The recording of the premiere performance (supplied with the performance materials) can be used as a model here though experimentation is encouraged.

rehearsal points

Given the cumulative series of programme changes and entries of oftentimes long sound files, it becomes almost impossible to jump into the piece at any particular rehearsal point: though the computer could step through the piece to arrive at the desired point, the sound files would probably not be in synch; these could however be simply faded down in order to rehearse the live processes alone.

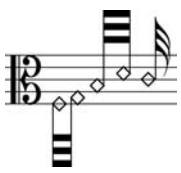
For more details about the software or performance of this piece please send email to info@sumtone.com or write to the address at the front of the score. More detailed instructions are, of course, provided with the performance software.

key to symbols

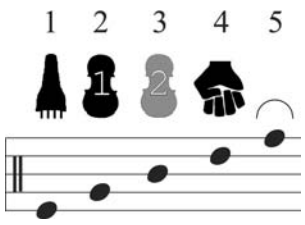
sp	sul ponticello
spe	sul ponticello estremo
st	sul tasto
ste	sul tasto estremo: the bow should be placed on the fingerboard just in front of the fingers.
sp	sul ponticello
vlb	very little bow: in very quiet dynamics only a little bow hair should be used to create a very thin, whispery tone.
cl	col legno
clb	col legno battuto
hair	With the hair of the bow (arco normale); used to cancel col legno and to clarify when ord. might incorrectly imply, for example, the cancellation of sul ponticello.
frog ~~frog~~	Some directions are cancelled by a repeat of the direction with a line through it: in each case a return to the "normal" mode of playing is implied, though any other directions (e.g. spe) will still be in effect.
	Quarter-tone flat
	12th-tone lower than ordinary sharp
	6th-tone lower than ordinary sharp
	12th-tone lower than ordinary natural
	Fast, unmeasured tremolo
	Unmeasured tremolo as fast as possible
	Battuto: A cross through the stem of a note always means battuto whether or not it is combined with any other effect (on the bridge/tailpiece/col legno etc.)
	Random fast harmonics on the indicated strings. Play lightly (as with natural harmonics) on the high part of the string where the harmonic nodes are more numerous. N.B. This is not a harmonic glissando, i.e., played with one sliding finger, rather all four fingers are in use randomly touching nodal and non-nodal points alike.

Dead harmonic: touch the string lightly at the indicated point and bow as if for a normal harmonic but stifle the production of a tone (if this were at a harmonic node) by placing a second finger (also lightly) behind the first. When this is indicated on two strings simultaneously (double stop), then touch both points of both strings as described above and dampen both strings with a third finger on both strings and behind the first two.

When the duration of a note is ambiguous (because of a diamond head or no head), then it is indicated in parentheses above the note.



From bar 222, single notes (i.e. not chords) with stems up are played on the G-String, stems down on the C-String (or later the D-String for the notes F#4, G4 and A4).



Each of the indicated five methods of playing is placed on a separate line of the staff. The staff uses a percussion clef instead of an alto clef. To make things clearer, a symbol accompanies each method together with the note placement on the different lines.

1. Bow the tailpiece with the hair or wood of the bow as indicated.
2. Find two differently pitched resonant places on the body of the viola (when played with the bow). The first is lower in pitch than the second. This symbol represents the first, number three the second.
3. Body position 2 (see above).
4. Tap with the knuckles on a resonant part of the body (may be the same or different part of the body from 1 and 2).
5. Play on the bridge: when this is to be performed with the hair of the bow, then special care should be taken to ensure that *only* the bridge is bowed, i.e. the strings to either side should be avoided. The sound produced is a dull noise, without any of the sul ponticello effects caused when bowing the strings nearby.

Blue arrows indicate a trigger point in the computer part. The first number is the bar in which this trigger point occurs (the Max patch indicates "next trigger bar number" to facilitate score reading and triggering). What follows is an indication of the processes that are triggered at this point; these are not always complete: at some points many different parameters are set simultaneously and it is neither possible nor necessary to notate all in the score. **≈1.4** indicates the start of sound file 4 in layer 1 (so **≈2.1** would indicate sound 1 in layer 2) . **G1** indicates that granular layer 1 begins (**G2** is then layer 2). $<$ and $>$ indicate crescendo and diminuendo respectively. **Freeze** refers to the granulator being used to "sample and hold" audio material; **unfreeze** means that it starts processing the current live viola signal again. **Loop** indicates the triggering of a loop of the viola signal. A strikethrough of any of these symbols indicates that the process is stopped.

tramontana

duration c. 13½–15min.

michael edwards 2002–4

twitchy; freezing often in the pauses
between small gestures

♩ = 44

Viola

Computer

frog

frog

extravagant

clb

clb

clb

clb

15: ≈1.1 G1 (ch.1-2) <

Tempo I

♩ = 44

suddenly aggressive

clb

hair

considerably faster ♩ = 52
broad; plenty of bow; projecting

26: ~~G1~~ G2<

29: G2
freeze

30: ~~G2~~ G1 (ch.1-4)

clb

clb

clb

clb

delicate

37: G1: freeze

38: G1: freeze

40: ~~G1~~ G2

42: G2
freeze, gliss

45: G2
unfreeze
(ch.1-6)

clb

trem rit

50: G2 ~~transp~~

54: G2 chord

57: ~~G2~~

faster ♩ = 48

clb

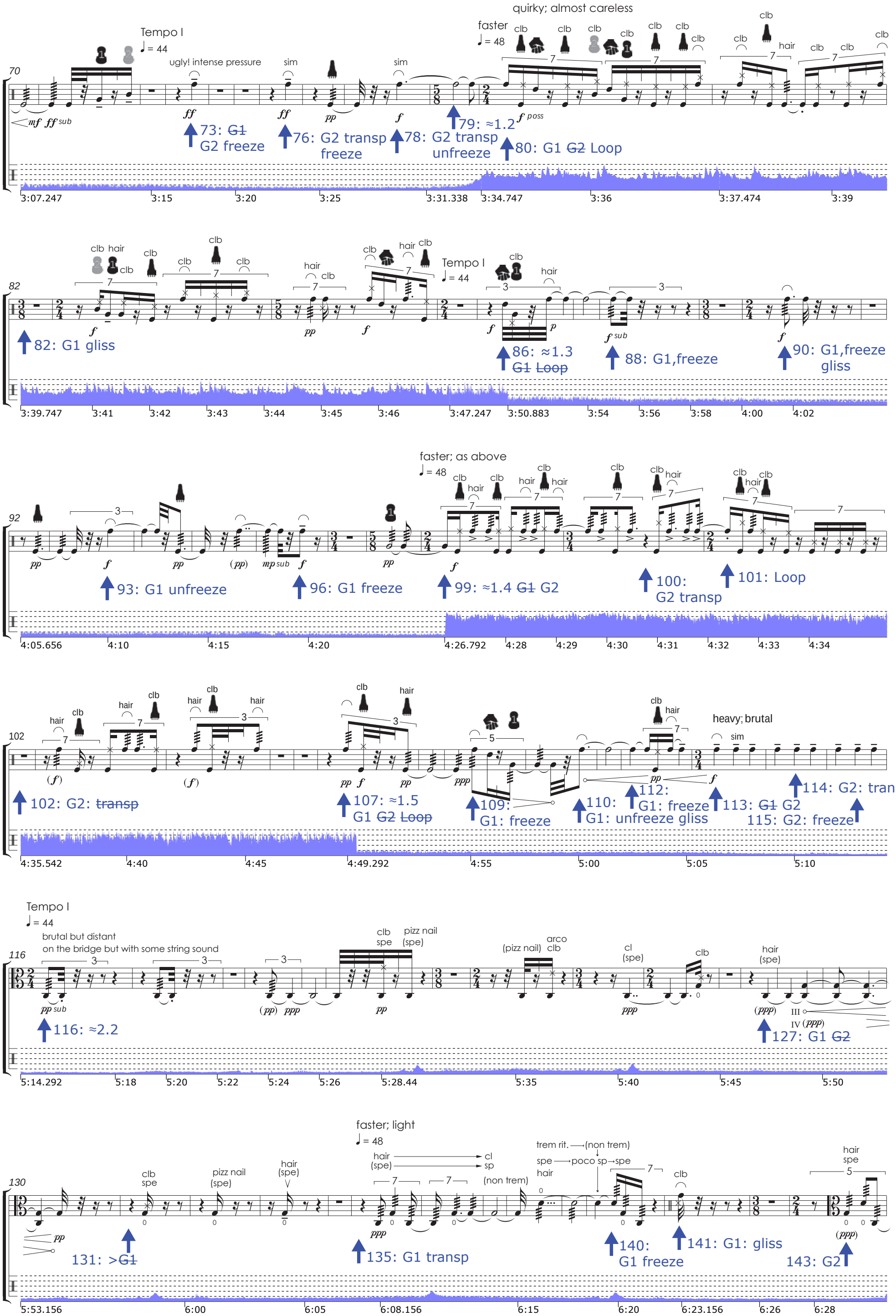
clb

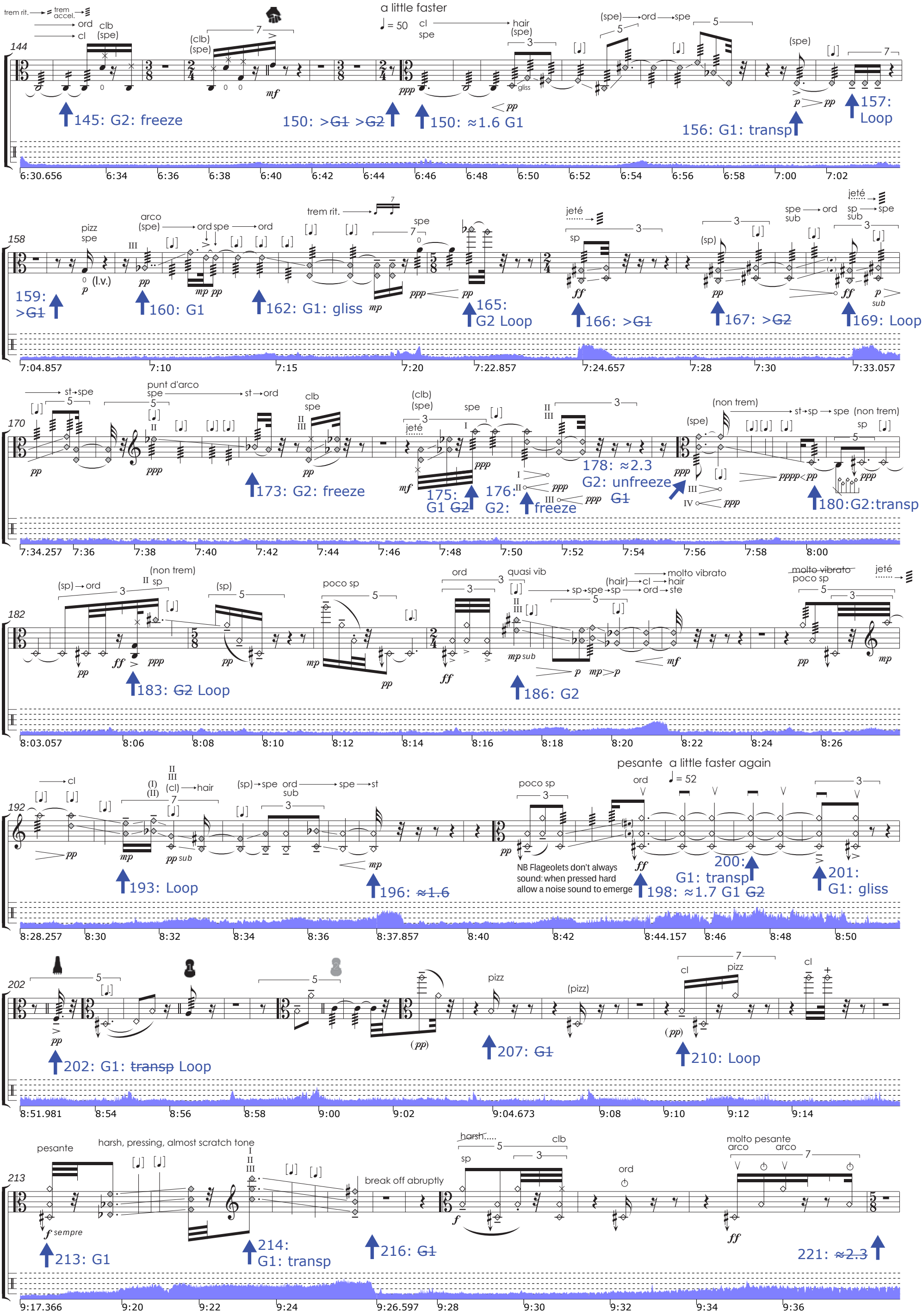
hair

big tone "quasi vibrato"

60: ≈2.1
G1 (ch.1-8)
Loop

60: G1


Tempo I
♩ = 44
ugly! intense pressure
sim
sim
quirky; almost careless
faster
♩ = 48
clb
hair
70
mf ff sub
ff
ff
pp
f
f poss
73: G1 G2 freeze
76: G2 transp freeze
78: G2 transp unfreeze
79: ≈1.2
80: G1 G2 Loop
3:07.247
3:15
3:20
3:25
3:31.338
3:34.747
3:36
3:37.474
3:39
82
f
pp
f
f
p
f sub
f
82: G1 gliss
86: ≈1.3 G1 Loop
88: G1,freeze
90: G1,freeze gliss
3:39.747
3:41
3:42
3:43
3:44
3:45
3:46
3:47.247
3:50.883
3:54
3:56
3:58
4:00
4:02
92
faster; as above
♩ = 48
pp
f
pp
(pp)
mp sub
f
pp
f
93: G1 unfreeze
96: G1 freeze
99: ≈1.4 G1 G2
100: G2 transp
101: Loop
4:05.656
4:10
4:15
4:20
4:26.792
4:28
4:29
4:30
4:31
4:32
4:33
4:34
102
(f)
(f)
pp f
pp
ppp
pp
f
heavy; brutal
sim
102: G2: transp
107: ≈1.5 G1 G2 Loop
109: G1: freeze
110: G1: unfreeze gliss
112: G1: freeze
113: G1 G2
114: G2: transp
115: G2: freeze
4:35.542
4:40
4:45
4:49.292
4:55
5:00
5:05
5:10
116
Tempo I
♩ = 44
brutal but distant
on the bridge but with some string sound
pp sub
(pp)
ppp
pp
(pizz nail)
ppp
(ppp)
III
IV (ppp)
116: ≈2.2
127: G1 G2
5:14.292
5:18
5:20
5:22
5:24
5:26
5:28.44
5:35
5:40
5:45
5:50
130
faster; light
♩ = 48
(non trem)
trem rit.
(non trem)
ppp
(ppp)
131: >G1
135: G1 transp
140: G1 freeze
141: G1: gliss
143: G2
5:53.156
6:00
6:05
6:08.156
6:15
6:20
6:23.156
6:26
6:28


144
trem rit.
trem accel.
ord
cl
clb (spe)
(clb) (spe)
mf
a little faster
♩ = 50
cl spe
hair (spe)
gliss
ppp
pp
(spe) ord spe
(spe)
p pp
145: G2: freeze
150: >G1 >G2
150: ≈1.6 G1
156: G1: transp
157: Loop
6:30.656
6:34
6:36
6:38
6:40
6:42
6:44
6:46
6:48
6:50
6:52
6:54
6:56
6:58
7:00
7:02
158
pizz spe
(l.v.)
arco (spe) ord spe ord
trem rit.
spe
jeté
sp
ff
spe sub ord
sp spe
sub
mp pp
159: >G1
160: G1
162: G1: gliss
165: G2 Loop
166: >G1
167: >G2
169: Loop
7:04.857
7:10
7:15
7:20
7:22.857
7:24.657
7:28
7:30
7:33.057
170
st spe
punt d'arcco
spe st ord
clb spe
(clb) (spe)
jeté
(non trem)
st sp spe
sp
173: G2: freeze
175: G1 G2
176: G2: freeze
178: ≈2.3 G2: unfreeze G1
180:G2:transp
7:34.257
7:36
7:38
7:40
7:42
7:44
7:46
7:48
7:50
7:52
7:54
7:56
7:58
8:00
182
(sp) ord
(non trem)
II sp
(sp)
poco sp
ord
quasi vib
molto vibrato
(hair) cl hair
sp spe sp ord ste
183: G2 Loop
186: G2
8:03.057
8:06
8:08
8:10
8:12
8:14
8:16
8:18
8:20
8:22
8:24
8:26
192
cl
(I) (II) (cl) hair
(sp) spe ord sub spe st
pesante a little faster again
poco sp
ord
♩ = 52
193: Loop
196: ≈1.6
NB Flageolets don't always sound: when pressed hard allow a noise sound to emerge
198: ≈1.7 G1 G2
200: G1: transp
201: G1: gliss
8:28.257
8:30
8:32
8:34
8:36
8:37.857
8:40
8:42
8:44.157
8:46
8:48
8:50
202
pizz
(pizz)
cl
(pp)
202: G1: transp Loop
207: G1
210: Loop
8:51.981
8:54
8:56
8:58
9:00
9:02
9:04.673
9:08
9:10
9:12
9:14
213
pesante
harsh, pressing, almost scratch tone
f sempre
harsh.....
clb
sp
break off abruptly
ord
molto pesante
arco
213: G1
214: G1: transp
216: G1
221: ≈2.3
9:17.366
9:20
9:22
9:24
9:26.597
9:28
9:30
9:32
9:34
9:36

a little faster yet
♩ = 5 4
chords: big, brash, rough, exciting
single notes: light, nimble

[sounding pitches]

222

NB Dead harmonics
don't actually sound

222: ≈2.4 G1: freeze Loop

9:38.712 9:42 9:44 9:46 9:48 9:50 9:52 9:54 9:56 9:58 10:00

231

sim
(after an accent, the tremolo can dim. to a forte
in preparation for the subsequent ff accent)

234: ≈1.8 Loop ~~≈2.4~~

10:03.258 10:06 10:08 10:10 10:12 10:14 10:16 10:18 10:20 10:22 10:24 10:26

240

243: ≈2.5 Loop G2 ~~G1~~ ~~≈1.8~~

10:27.804 10:30 10:32 10:34 10:36 10:38 10:40 10:42 10:44 10:46 10:48

248

250: G2: chord

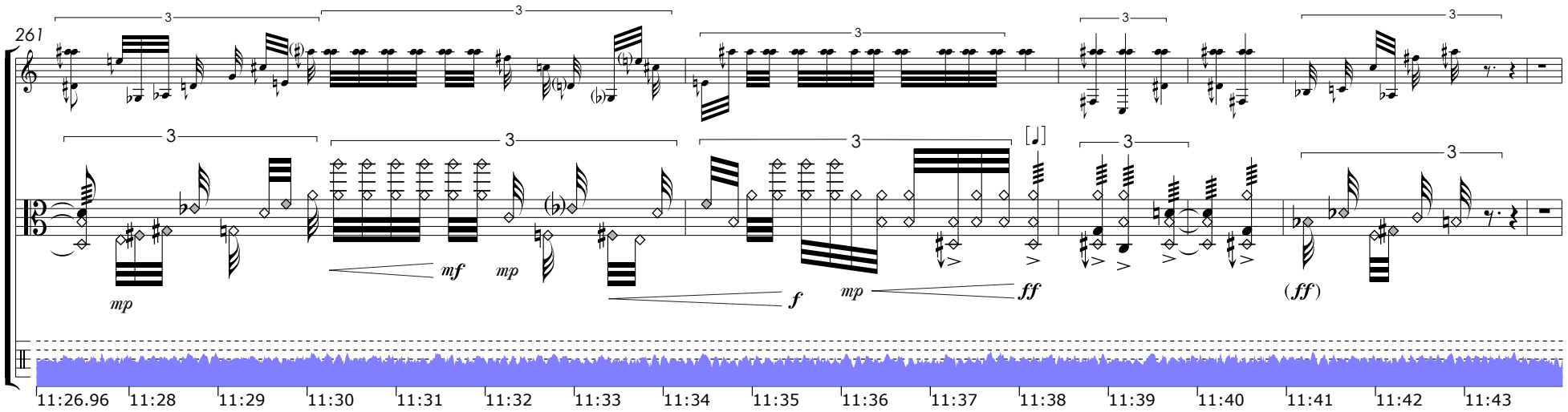
253: ≈1.9 Loop ~~≈2.5~~

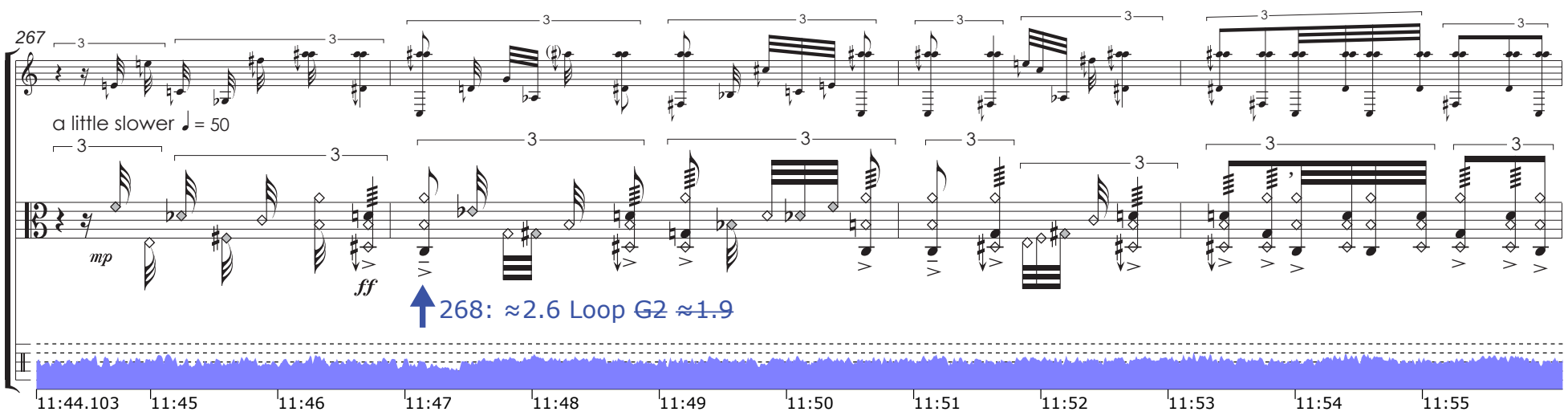
10:49.622 10:52 10:54 10:56 10:58 11:00 11:02 11:04 11:06 11:08 11:10

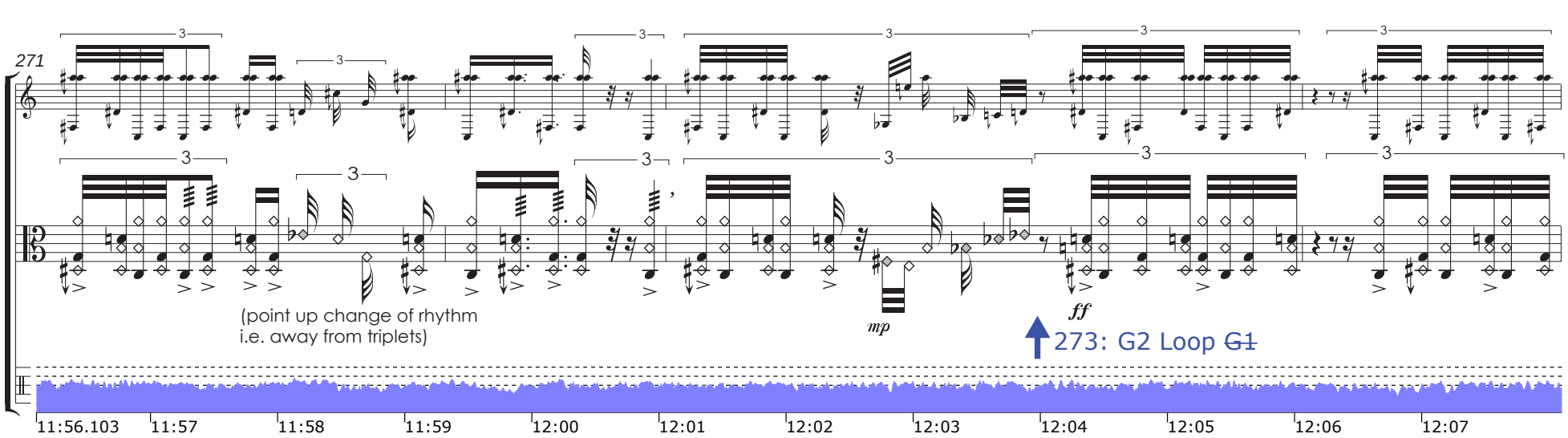
256

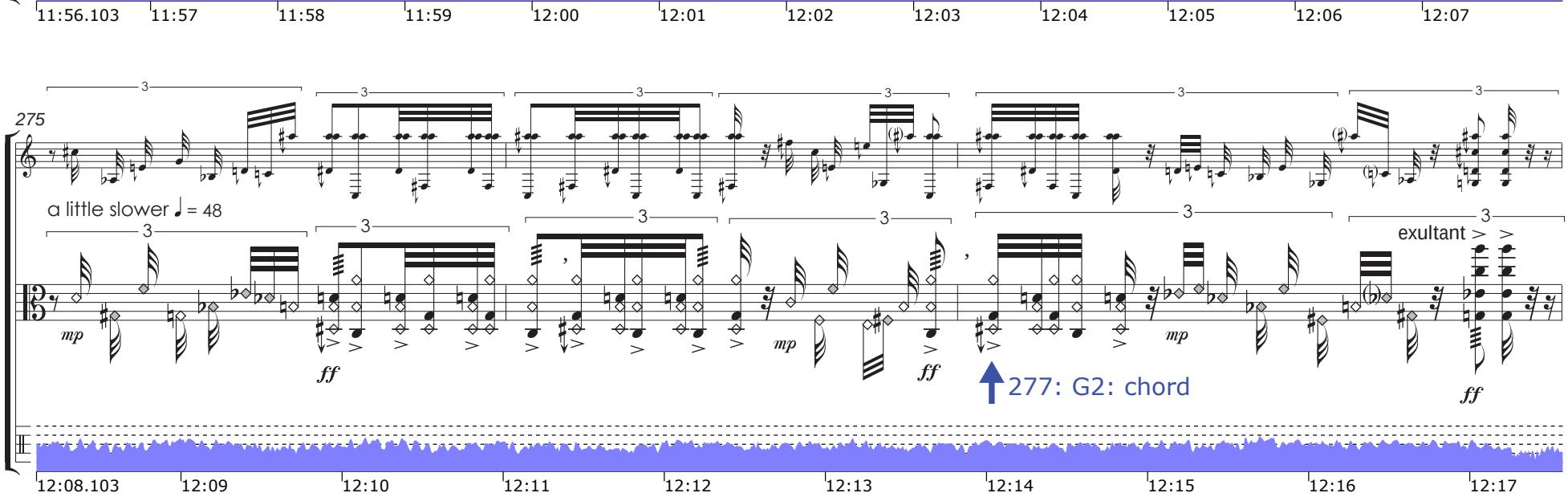
a little slower ♩ = 52

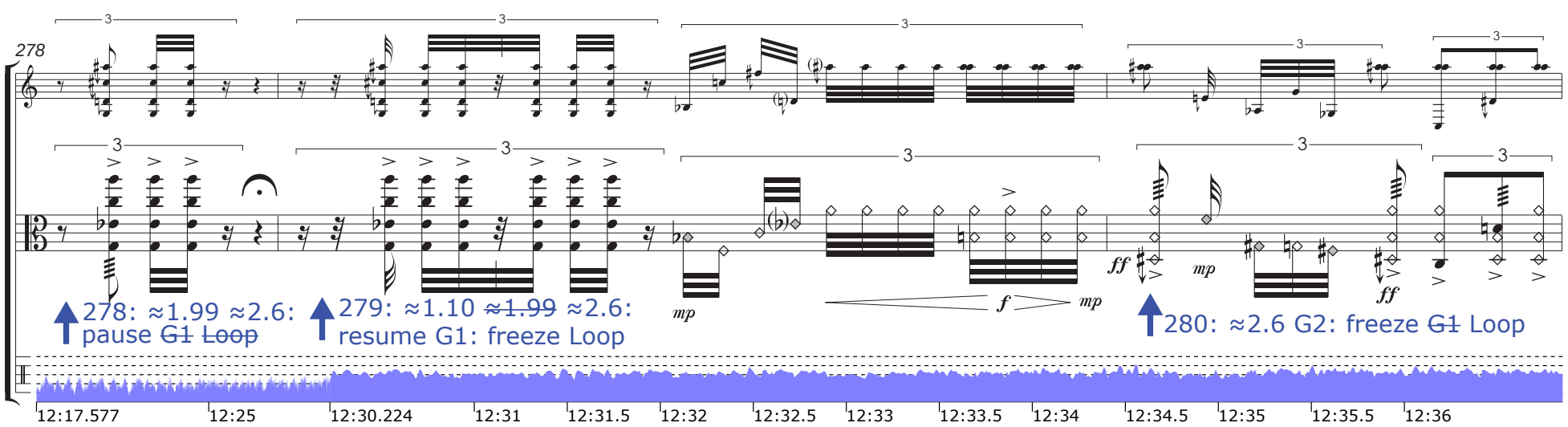
11:12.804 11:14 11:15 11:16 11:17 11:18 11:19 11:20 11:21 11:22 11:23 11:24 11:25 11:26


261
mp
mf
mp
f
mp
ff
(ff)
11:26.96
11:28
11:29
11:30
11:31
11:32
11:33
11:34
11:35
11:36
11:37
11:38
11:39
11:40
11:41
11:42
11:43


267
a little slower ♩ = 50
mp
ff
268: ≈2.6 Loop G2 ≈1.9
11:44.103
11:45
11:46
11:47
11:48
11:49
11:50
11:51
11:52
11:53
11:54
11:55


271
(point up change of rhythm
i.e. away from triplets)
mp
ff
273: G2 Loop G1
11:56.103
11:57
11:58
11:59
12:00
12:01
12:02
12:03
12:04
12:05
12:06
12:07


275
a little slower ♩ = 48
exultant
mp
ff
277: G2: chord
12:08.103
12:09
12:10
12:11
12:12
12:13
12:14
12:15
12:16
12:17


278
278: ≈1.99 ≈2.6:
pause G1 Loop
279: ≈1.10 ≈1.99 ≈2.6:
resume G1: freeze Loop
mp
f
mp
ff
mp
ff
280: ≈2.6 G2: freeze G1 Loop
12:17.577
12:25
12:30.224
12:31
12:31.5
12:32
12:32.5
12:33
12:33.5
12:34
12:34.5
12:35
12:35.5
12:36

281

a little slower ♩ = 46

mp ff mp! ff mp (mp)

12:36.851 12:38 12:39 12:40 12:41 12:42 12:43 12:44 12:45 12:46

284

mf ff (ff) mp p mp

12:46.851 12:48 12:49 12:50 12:51 12:52 12:53 12:54 12:55 12:56

287

f mp f mp

288: G1: unfreeze

12:56.851 12:57.5 12:58 12:58.5 12:59 12:59.5 13:00 13:00.5 13:01 13:01.5 13:02 13:02.5 13:03

289

a little slower ♩ = 44

p

289: ≈2.7 Loop G1 ~~G2~~

13:03.518 13:04 13:04.5 13:05 13:05.5 13:06 13:06.5 13:07 13:07.5 13:08 13:08.5 13:09 13:09.5 13:10

291

cresc. poco a poco al fine

13:10.577 13:11 13:11.5 13:12 13:12.5 13:13 13:13.5 13:14 13:14.5 13:15 13:15.5 13:16 13:16.5 13:17

293

294: Loop

13:17.636 13:18.5 13:19 13:19.5 13:20 13:20.5 13:21 13:21.5 13:22 13:22.5 13:23 13:23.5 13:24

295

296: ≈2.8

13:24.695 13:25.5 13:26 13:26.5 13:27 13:27.5 13:28 13:28.5 13:29 13:29.5 13:30 13:30.5 13:31

297

13:31.754 13:32.5 13:33 13:33.5 13:34 13:34.5 13:35 13:35.5 13:36 13:36.5 13:37 13:37.5 13:38

299

(mf)

299: Loop G2 ~~G1~~

13:38.812 13:39.5 13:40 13:40.5 13:41 13:41.5 13:42 13:42.5 13:43 13:43.5 13:44 13:44.5 13:45

301

13:45.871 13:46.5 13:47 13:47.5 13:48 13:48.5 13:49 13:49.5 13:50 13:50.5 13:51 13:51.5 13:52 13:52.5

303

303: Loop

13:52.93 13:53.5 13:54 13:54.5 13:55 13:55.5 13:56 13:56.5 13:57 13:57.5 13:58 13:58.5 13:59 13:59.5

305

(f)

13:59.989 14:00.5 14:01 14:01.5 14:02 14:02.5 14:03 14:03.5 14:04 14:04.5 14:05 14:05.5 14:06 14:06.5

307

307: Loop G1 ~~G2~~

14:07.048 14:07.5 14:08 14:08.5 14:09 14:09.5 14:10 14:10.5 14:11 14:11.5 14:12 14:12.5 14:13 14:13.5

309

14:14.106 14:15 14:15.5 14:16 14:16.5 14:17 14:17.5 14:18 14:18.5 14:19 14:19.5 14:20 14:20.5

311

(ff)

311: ≈1.11 Loop G2 ~~G1~~

14:21.165 14:22 14:22.5 14:23 14:23.5 14:24 14:24.5 14:25 14:25.5 14:26 14:26.5 14:27 14:27.5

313

315

315: Loop

317

319

319: Loop G1 ~~G2~~

321

fff

ffff

* Pause as if exhausted
then final defiant tremolo

322: all off

14:27:54 Sat Feb 14 2009 GMT Standard Time