ASYMPTOTIC FLUX: FIRST STUDY IN ENTROPY

for amplified bass clarinet, violin, viola, cello, & electronics

Co-commissioned by OSSIA & the [Switch~ Ensemble]
(with special thanks to Madison Greenstone)

by

JASON THORPE BUCHANAN

MELOS MUSIC

September 25, 2012; Rev. 1 - April 12, 2013
**Electronics completed May 7, 2014*

PERFORMANCE NOTES:
Many of the techniques in this work are employed explicitly to destabilize or distort the timbral qualities of each instrument, and thus require very detailed notation. Once these techniques and their context within the work are understood, it may be possible to play more freely within this syntax with a more organic, or even improvisatory character. The performance should not be constrained or adhere too rigidly to what is written on the page, but rather flow fluidly and naturally. Version with electronics was completed for the first performance at the NYC Electroacoustic Music Festival in June, 2014 by the [Switch~ Ensemble]. The Max/MSP patch and audio files can be obtained by contacting jasontbuchanan@gmail.com

PITCH NOTATION:

Series of quarter-tones (one semitone = 100 cents (ct), one octave = 1200 cents):

Three-quarter-flat (-150 ct)	Flat (-100 ct)	Quarter-flat (-50 ct)	Natural (0 ct)	Quarter-sharp (+50 ct)	Sharp (+100 ct)	Three-quarter-sharp (+150 ct)

Series of sixth-tones: (arrows may also be used in conjunction with quarter tones to approximate smaller inflections):

6th-tone lower (-133 ct)	6th-tone higher (-66 cents)	6th-tone lower (-33 cents)	6th-tone higher (+33 cents)	6th-tone lower (+66 cents)	6th-tone higher (+133 cents)

TEMPORAL NOTATION: Indicates a sustained tone for the duration specified.

A relatively short fermata.

TRILLS/TREMOLOS/BISBIGLIANDOS:

CLARINET: Bisbigliando or timbral trill, typically on a multiphonic (fingering provided). This results in a subtle timbral change using alternative/auxiliary fingerings less than a sixth-tone difference in pitch.

STRINGS: Trill between a "normal" pitch (pictured: open string, semi-pitched, low bow speed) and a "half-press" (finger pressure between norm. and harm.), producing a multiphonic or split-tone, not necessarily on a harmonic node.

Trill between a harmonic and "half-press" by lightly changing finger pressure while remaining in the same location on the string. May also be between "normal" pressure and harmonic, or "normal" and "half-press."

BOW PRESSURE/LOCATION:

Semi-scratch tones, medium bow pressure, very little definite pitch.

Full-scratch tones, high bow pressure, no definite pitch whatsoever.

Gradual increase of bow pressure to scratch, followed by gradual decrease of bow pressure.

An additional staff above each part indicates the lateral position of the bow on the instrument. The center line represents a normal (**ORD**) position, with the upper line representing the bridge (**ASP**) and the lower line the fingerboard (**AST**).

ASP: Alto Sul Ponticello, very close to the bridge. **SP**: Sul Ponticello **ORD**: Ordinario **ST**: Sul Tasto **AST**: Alto Sul Tasto, well above the fingerboard.
h. sul pont ---- Bow near the bridge, constantly adjusting the bow position, speed, and pressure ad libitum to emphasize different harmonics and drastically alter the timbre.
DIAGONAL BOW POSITION: Nearly parallel to strings, with sufficient bow pressure to achieve a very rich and unpredictable harmonic spectrum. This is often accompanied by rotational bow motion and arpeggiation of multiple strings, notated using tablature for the location of the bow over each string.
ON BRIDGE: Bowing directly on the bridge, or bowing diagonally with the bow nearly parallel to the strings, it may be possible to bow both the bridge and strings simultaneously.

Harmonic sweep, arpeggiation of all four strings with bow while swiftly gliding the left hand up the fingerboard and back to produce a rapid harmonic gliss on all four strings simultaneously.

CELLO SCORDATURA & BASS CLARINET TRANSPOSITION: The cello strings are tuned to the 3rd, 5th, 7th, and 11th partials of a virtual low $E\updownarrow_0$ fundamental (19.6 Hz), well below the range of the piano (and certainly the cello or bass clarinet), approximately 58.8 Hz ($B\updownarrow$), 98 Hz ($G\natural$), 137.2 Hz ($D\downarrow$), and 215.6 Hz ($A\updownarrow$), respectively. This tuning is employed to achieve a variety of natural harmonics over each of string as a fundamental. The bass clarinet is written in B♭, and sounds a Major Ninth lower than written.

CHOREOGRAPHIC CLEFS:

Lateral motion up and down the fingerboard with only bow.

String tablature, I, II, III, IV.

Reverse position of hand & bow, lateral motion with both bow and hand.

Bow Position (ASP, SP, ORD, ST, AST, etc.), explained above.

CLARINET EMBOUCHURE/VOCALIZATIONS:

The staff above the clarinet indicates the embouchure shape as well as vocalizations and other techniques.

The embouchure shape is designated in four stages, from bottom to top: "u", "eu", "e", and "i". These changes in embouchure affect both the pitch and timbre of a normal tone, or as it is more commonly used here, a multiphonic.

Contour lines accompanied by +/- cent indications represent the approximate shape of a pitch bend, executed by increasing or decreasing jaw pressure. These embouchure markings and pitch bends are often used in conjunction.

Often a jagged, approximate pitch contour is given, which may be freely interpreted at the discretion of the performer, keeping in mind the character of the work and using aesthetically appropriate musical gestures. In some cases it can be executed entirely using the embouchure or voice, and in others it will require a fingered glissando that can be improvised by the performer.

HARMONICS: ③ A circled number indicates a specific partial in the harmonic series and corresponds to the location of the written diamond notehead. For strings, this typically indicates a natural harmonic located at a particular node on an open string. For the bass clarinet, this number may be an approximate upper target when overblowing. Many of the passages employ arpeggiation of all four strings on natural harmonics, with these numbers indicating the position on all four strings that can be barred.

NOTEHEAD TYPES:

Diamond noteheads indicate harmonics (natural or artificial). Triangular noteheads: 

indicate the highest possible (or practical) pitch/location that can be achieved. "X" noteheads or regular noteheads with X slashes:  always indicate a noise or indefinite pitch element; a scratch or semi-scratch tone, col legno, slap tongue, etc., dependent upon the precise indication. These often occur at the end of a phrase, indicating a "dead stroke"; meaning that the bow should suddenly stop the string, or the embouchure should suddenly seal.

Square noteheads with single or double slash marks indicate slow bow speed with lateral motion for the strings, or a soft, breathy/air tone that has very little definite pitch for the clarinet. Triangle noteheads that are open rather than closed (black), indicate a harmonic as high up the string as possible (often followed by a gliss/port.) Any type of half-filled notehead (triangular or diamond) indicates a "half-press," the finger pressure being somewhere between that of a harmonic and a normal tone.

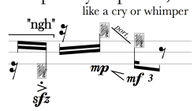
CLARINET ARTICULATIONS:

Slap tongue

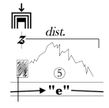

Quasi-slap tongue

𝆒 Distortion of tone with voice/throat

VOCALIZATIONS: Vocalizations in the bass clarinet part are given on a three line staff indicating the approximate vocal range of the performer. The prescribed contours and registers should be observed as accurately as possible, though much detail is left up to the discretion of the performer, keeping in mind the character of the work and musically appropriate gestures. The scratch tone symbol when it appears in the clarinet part indicates distortion of the clarinet tone by the voice and/or throat and embouchure, often accompanied by a pitch contour for the voice as well. It is important that the voice is never completely exposed, but only coloring or modulating the tone of the clarinet. When modulation with the voice occurs, do not be concerned with adhering to the notated pitch with accuracy; the distortion and sum/difference tones drastically alter the sounding pitch.

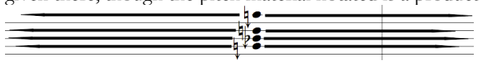


"ngh" indicates a low, guttural vocalization, like clearing your throat.



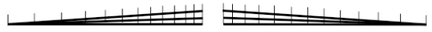
A high register vocalization, distorting the clarinet with a rising then falling contour.

MULTIPHONICS: Nearly all of the multiphonics utilized in this work (with the exception of 84b), are taken from Harry Sparnay's book "The Bass Clarinet" (Periferia Music, ISBN: 978-84-938845-2-9) and are numbered accordingly. The fingerings shown are the same as are given there, though the pitch material notated is a product of my own sampling and spectral analysis of each of these multiphonics. "Multiphonic Fades" begin from the fundamental and gradually add the additional pitch content before fading back, as fluidly as possible.



OTHER MARKINGS: All passages inside event boxes are to be repeated ad libitum with a consistent pulse that is independent of the ensemble's pulse. These are accompanied by additional instructions, such as accel. or decel., change of pitch, bow pressure, regularity, etc.

DYNAMIC & TEMPORAL INDICATIONS: All dynamic markings should be considered relative, indicating the extremes of each instrument while utilizing a given technique. For example, the maximum amplitude (dynamic level) possible with an artificial harmonic is lower than that of a normally fingered pitch. Similarly, lateral bow motion is much softer than vertical (up/down) bow motion; some multiphonics are softer than others, air tones and other extended techniques might be softer or louder, etc., so it should be understood that the dynamics indicated apply to the upper and lower dynamic range of whichever particular technique or context within which it exists. In the same way, all temporal indications, such as accel. or decel. markings (below), are completely relative to the rate of rearticulation directly preceding or succeeding the indication. If there is no rate specified, it is left up to the discretion of the performer to determine a musically appropriate interpretation.


These symbols can be applied to a variety of techniques, such as trills, multiphonic tremolos, harmonic tremolos, bisbigliandos/timbral trills, rearticulations, and event box tempi to indicate relative acceleration and deceleration. In other words, the number of beams does not indicate a precise subdivision, but rather an increase or decrease of speed.

AMPLIFICATION: Ideally, the clarinet will be amplified using a combination of one (1) condenser microphone, one (1) large diaphragm dynamic microphone, with optional two (2) to three (3) contact or micro-condenser microphones affixed to different locations on the body of the instrument to obtain a mixture that will boost the low frequencies and capture the dirtier/grittier qualities of the instrument effectively. Strings should be amplified using omni-directional micro condensers near the bridge, such as DPA 4060s or DPA 4099s, with an additional contact microphone on the body of the cello. One microphone per instrument should be sent to the audio interface for a Macbook Pro laptop running the Max/MSP patch. The dry amplification level (output from Max/MSP to a mixer) should be loud enough so that the vocalizations by the clarinetist are not heard clearly in the acoustic space, but covered by the amplification of the resonating instrument bodies. The output is optimized for a quadrophonic speaker configuration.

Asymptotic Flux: First Study in Entropy

for amplified bass clarinet, violin, viola & cello

Co-commissioned by OSSIA and the [Switch~ Ensemble]
(with special thanks to Madison Greenstone)

Jason Thorpe Buchanan
Summer 2012

Transposed Score

A

♩ = c.40

subito ♩ = c.60

molto rit. (♩ = c. 48)

(Emb/Vox)

Bass Clarinet (B♭)

airtone, do not seal embouchure until (x) very slight hint of pitch, end as short and percussive as possible

begin only with fundamental, fade into multiphonic as smoothly and gradually as possible

"eu" "e" "eu"

subtle overblowing, number indicates approx. partial
suppress upper partials above this number, gradually fade into multiphonic during rearticulation

poco accel. reart. m. 96 *poco decel. reart.*

quasi-legato *sim.*

Violin

III IV *con sord.* *bow on fingerboard, slow lateral motion towards bridge*

left hand fingers lead closely in front of the bow, muting the strings and producing harmonics

h. sul pont AST ASP

legato *port.*

poco accel. event tempo *(half-press)* *poco decel. event tempo*

Viola

III IV *con sord.* *bow on fingerboard, slow lateral motion towards bridge*

h. sul pont *circular bowing* ST AST ASP

port. *(half-press)* *harm. gliss.* *slow bow speed*

Electronics

001 002 003

Violoncello (fingered pitch)

SP AST ASP ST

con sord. *harm. gliss.* *(half-press)* *very slow bow speed*

sempre legato *(slow bow speed)*

Violoncello (sounding pitch)

harm. gliss. *(half-press)* *very slow bow speed*

sempre legato

Sep. 17, 2012; Rev. 1 - April 12, 2013; Electronics May 7, 2014

Asymptotic Flux: First Study in Entropy

B.Cl.

Vln.

Vla.

Elec.

Vlc.

= c.48

guttural, indefinite pitch vocalization

like a cry or whimper

B

subito

= c.54-60 molto rubato

dist.

"u"

"e"

"u"

m. 96

(jaw pressure)

timbral trill

slap

poco accel. reart.

poco decel. reart.

the distortion from the vocalization will change the sounding pitch; do not be concerned with adhering to notated pitch with accuracy

C

"ngh"

like a cry or whimper

"eu"

quasi-slap

circular breathing would be ideal for these passages, but if necessary, breathe where indicated

h. sul pont

AST

ASP

poco accel. trem.

poco decel. trem.

at frog

at tip

senza sord.

molto vib.

(half-press trill)

lateral motion towards bridge

poco decel. reart.

ORD

SP

ST

004

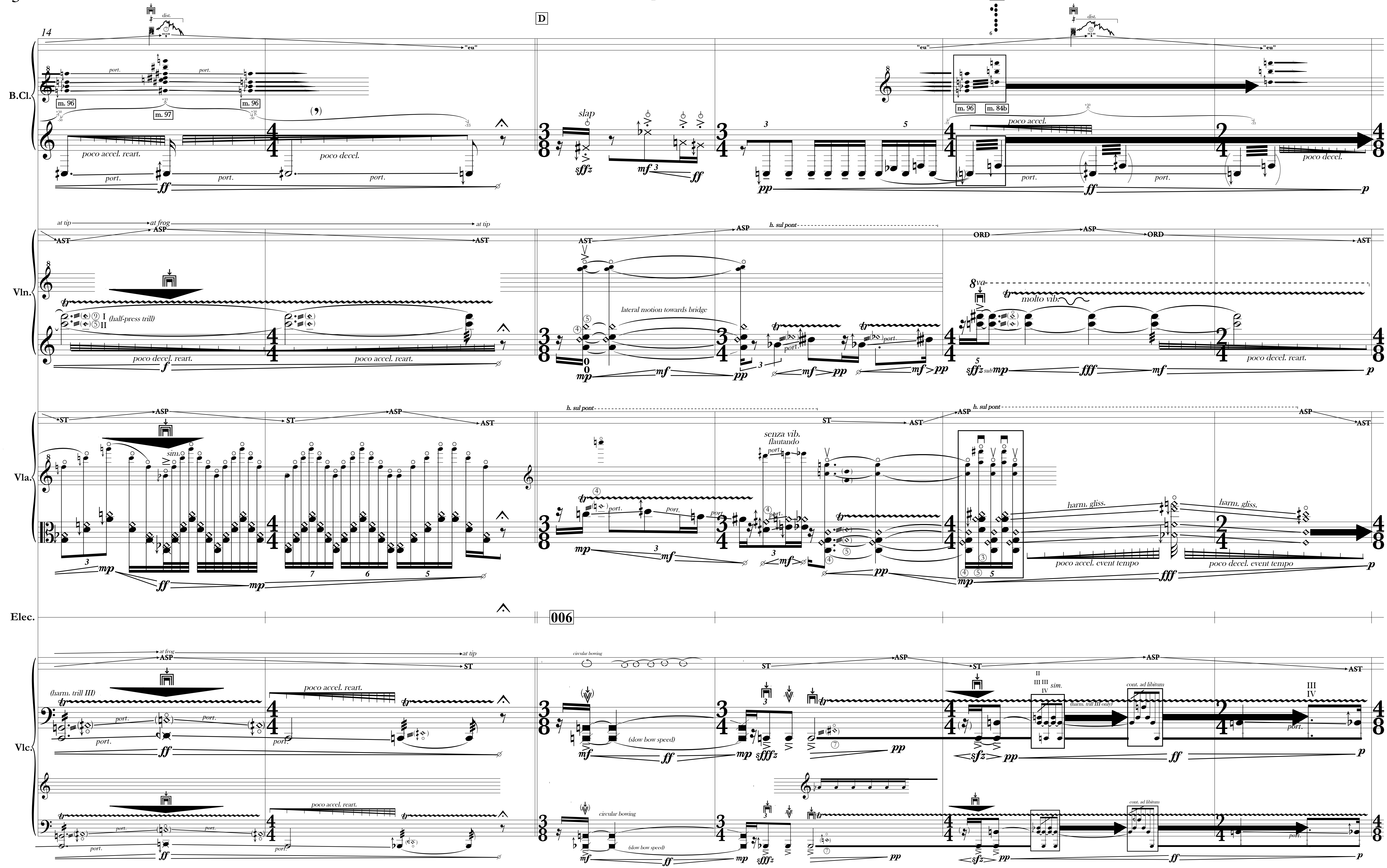
005

(slow trill)

circular bowing

slow bow speed

port.


14
D
B.Cl.
Vln.
Vla.
Elec.
Vlc.
port.
m. 96
m. 97
m. 84b
poco accel. reart.
poco decel.
poco accel.
slap
ff
sffz
mf
pp
p
at tip
at frog
AST
ASP
ST
ORD
h. sul pont
(half-press trill)
poco decel. reart.
poco accel. reart.
lateral motion towards bridge
molto vib.
8va
sim.
senza vib.
flautando
harm. gliss.
poco accel. event tempo
poco decel. event tempo
mp
fff
006
circular bowing
(harm. trill III)
(slow bow speed)
sfffz
sfz
cont. ad libitum
(harm. trill III only)

20

E

F

subito ♩= c.66-72

B.Cl.

Vln.

Vla.

Elec.

Vlc.

007

008

009

m. 82

m. 9 (bsb. w/key 5)

m. 30 ♯ 31

(+ E key bsb.)

11th partial should sound intermittently

fundamental will drop out

≥ senza vib., frozen, like electronic feedback

slap

col legno battuto

molto vib.

sempre legato

poco accel. reart.

poco decel. reart.

(half-press)

port.

legato

poco accel.

poco decel.

senza vib.

détaché

alternate irregularly between each string)

h. sul pont

at frog

ASP

AST

ST

ORD

subito

snap pizz.

arco

(poco col legno)

Asymptotic Flux: First Study in Entropy

B.Cl.

Vln.

Vla.

Elec.

Vlc.

m. 32 — decel. — gritty/dirty jagged fall — animalistic — like a cry or whimper — 'ngh' — G — timbral trill — m. 96 — m. 97 — m. 4 — (+ G♯ key bisb.) — m. 4 ♯ key 8 — dist./break — H — m. 25 — "eu" — fltr./dist. — accel. — decel. — senza vib., frozen, like electronic feedback

molto vib. — sempre legato — h. sul pont — (hall-press trill) — at tip — poco accel. reart. — (détaché) — (rate of rearticulation)

010

33

I

subito ♩ = 60

accel. ♩ = c.66-72

B.Cl.

Vln.

Vla.

Elec.

Vlc.

011

012

013

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41

J

K molto rubato

B.Cl.

Vln.

Vla.

Elec.

014

Vlc.

B.Cl.

Vln.

Vla.

Elec.

Vlc.

50

L

M

m.3

m.71

m.50

m.49

dist., as gritty and dirty as possible

jagged fall ad libitum

m. 3

m. 71 (bisb. w/key 14)

m. 50 ♯ 3rd fing. r.h.

m. 49

accel.

poco accel.

fltr.

dist./break

poco decel. bisb.

poco accel. reart.

molto vib.

port.

poco decel.

jagged gliss/fall ad libitum

senza vib.

détaché

legato

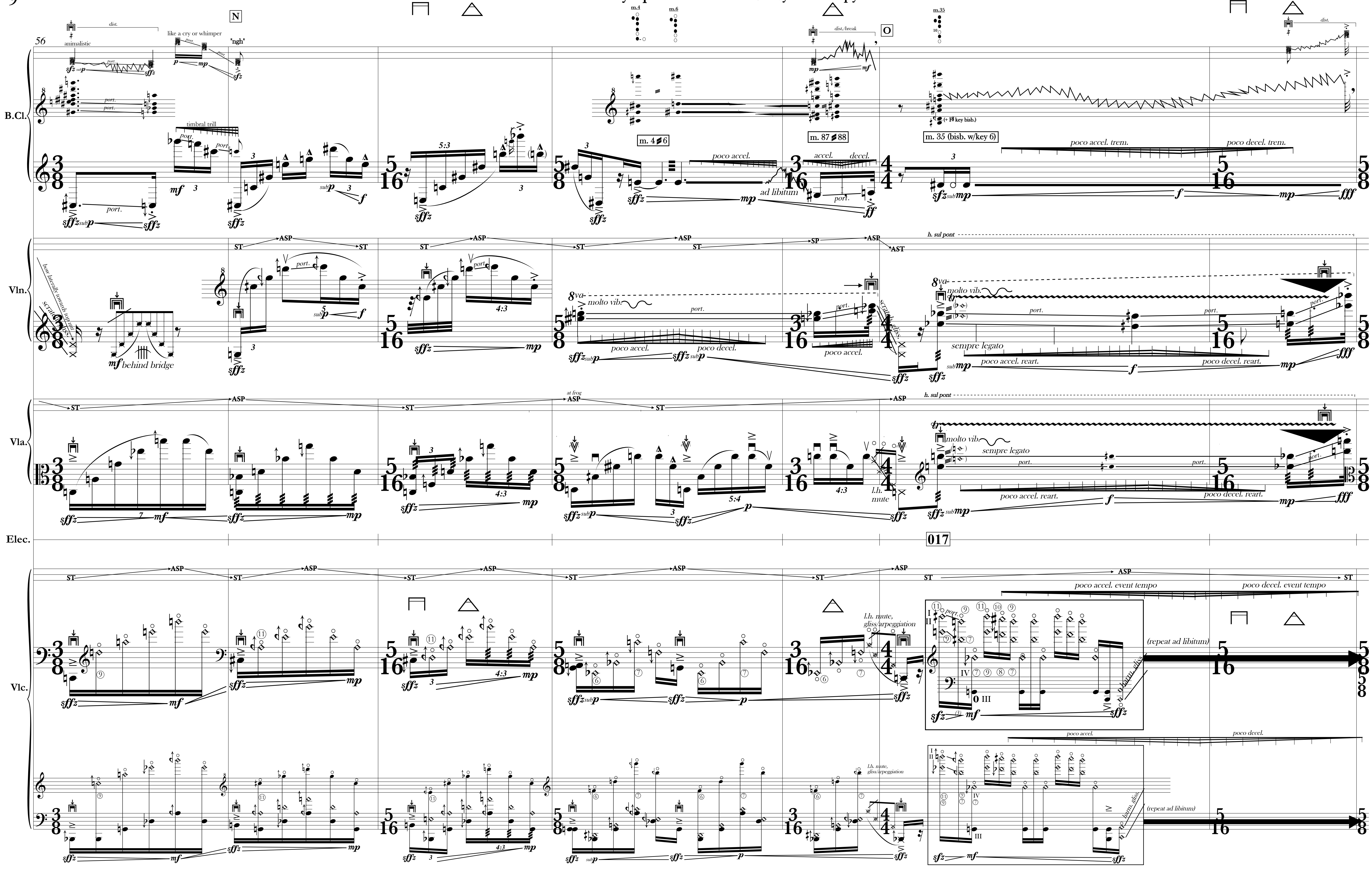
h. sul pont

bow laterally towards top nut

scratch tasc.

015

016


56
N
O
animalistic
dist.
like a cry or whimper
"ngh"
timbral trill
m. 4 6
m. 87 88
m. 35 (bisb. w/key 6)
dist./break
poco accel.
ad libitum
accel.
decel.
poco accel. trem.
poco decel. trem.
B.Cl.
Vln.
Vla.
Elec.
Vlc.
ST
ASP
SP
AST
h. sul pont
at frog
bow laterally towards tailpiece
scratch
behind bridge
molto vib.
poco decel.
sempre legato
poco accel. reart.
poco decel. reart.
l.h. mute
017
l.h. mute, gliss/arpeggiation
poco accel. event tempo
poco decel. event tempo
(repeat ad libitum)
harm. gliss.

molto rit. (♩ = c. 40) ♩ = c.66-72

63

B.Cl.

airtone, do not seal embouchure until (x) very slight hint of pitch, end as short and percussive as possible

m. 84a m. 84b m. 96 m. 97 m. 84b ♯87

slap

quasi-slap

(prestissimo possibile)

broad, quasi-fermata

Vln.

b. sul pont

harm. gliss.

poco accel. poco decel. accel. prestissimo possibile

col legno battuto

(half-press trill)

harmonic gliss bow strings alternately

Vla.

slow bow speed

molto vib.

pizz.

arco

l.h. slide

Elec.

018 019 020 021

Vlc.

Asymptotic Flux: First Study in Entropy

R

71

S

B.Cl.

Vln.

Vla.

Elec.

022

Vlc.

79

subito ♩ = c.48 rit. (♩ = c. 40) ♩ = c.66

T U

c.5-6"

B.Cl.

m. 84b ♯ 87 m. 1 m. 96 ♯ 84b m. 97 m. 96

nearly voiceless, breathy

pppp possible ppp pppp possible pp sfffz mf sfffz sub p mf p port. port. port. port. fff p sfz

poco accel.

Vln.

h. sul pont (behind bridge ad libitum) h. sul pont ORD h. sul pont (behind bridge ad libitum) ASP ST

(half-press trill) poco port. ad libitum pppp possible pp mfsub p ff 8va senza vib. poco port. ad libitum mf sub pp mf p fff molto vib. poco decel. reart. p mf pp port. poco accel.

Vla.

h. sul pont (behind bridge ad libitum) ST ASP h. sul pont at frog ASP ST

(half-press trill) poco port. ad libitum pppp possible pp mp poco decel. event tempo mf p poco accel. fff poco decel. p mf pp harm. gliss. con sord.

Elec.

023 024

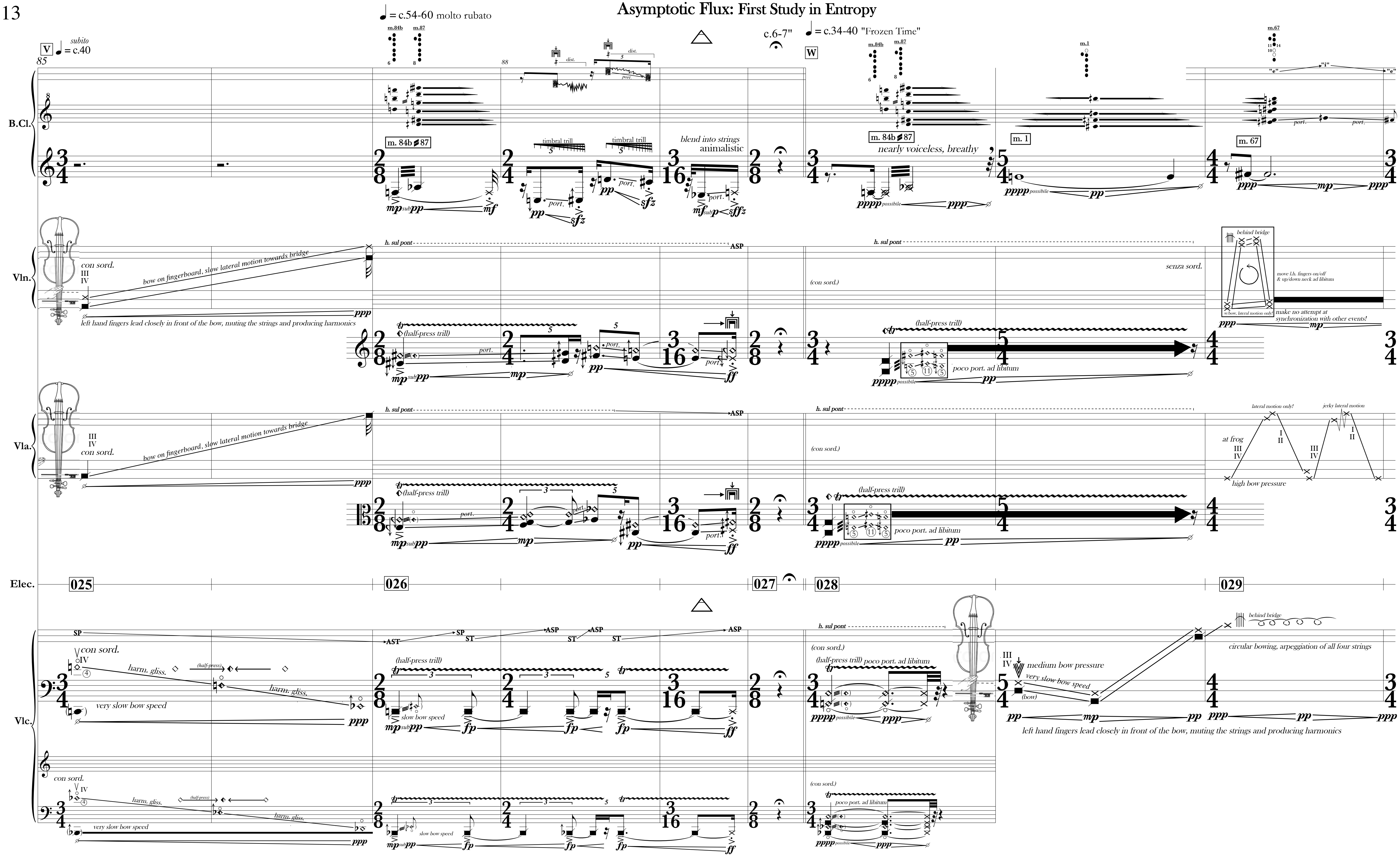
Vlc.

h. sul pont SP at tip ST at frog ASP at tip ST

(half-press trill) poco port. ad libitum pppp possible ppp very slow bow speed mp pp

medium bow pressure, fingers must follow closely in front of bow to produce harmonics

poco decel. harm. trill harm. gliss./port sfffz pp mf p fff poco accel. harm trill poco decel. harm. trill harm. gliss./port con sord.


subito
= c.40
= c.54-60 molto rubato
c.6-7"
= c.34-40 "Frozen Time"
B.Cl.
m. 84b 87
timbral trill
dist.
port.
blend into strings
animalistic
nearly voiceless, breathy
m. 1
m. 67
possibile
Vln.
con sord.
bow on fingerboard, slow lateral motion towards bridge
left hand fingers lead closely in front of the bow, muting the strings and producing harmonics
h. sul pont
ASP
(half-press trill)
(con sord.)
poco port. ad libitum
senza sord.
behind bridge
move l.h. fingers on/off & up/down neck ad libitum
make no attempt at synchronization with other events!
Vla.
at frog
high bow pressure
lateral motion only!
jerky lateral motion
Elec.
025
026
027
028
029
Vlc.
very slow bow speed
harm. gliss.
(half-press)
slow bow speed
medium bow pressure
very slow bow speed
(bow)
circular bowing, arpeggiation of all four strings
left hand fingers lead closely in front of the bow, muting the strings and producing harmonics

94

B.Cl.

m.14 m.18 m.3b m.66 m.2b m.35 m.27

"e" "i" "e" break

m. 14 m. 14 ♯ 3rd fing. r.h. (bisb.) m. 18 m. 3b m. 66 m. 2b m. 35 m. 27

legato possibile

X

"eu" "i" "eu"

harmonies should not be overt, but rather voiceless/breathy with very little definite pitch, always covered by the strings

ppp pp mp pp ppp pp ppp pp ppp pp ppp pp

Vln.

h. sul pont

ROTATE BOW

I II III IV

at tip BRIDGE/ASP at frog AST

diagonal bow angle, nearly parallel to strings

(half-press trill)

poco port. ad libitum

glide fingers lightly up and down strings ad libitum
relatively slow bow speed, bow pressure ad libitum

use lateral and rotational bow motion when changing bow direction, keep sound even as possible

high bow speed

harm. gliss.

pppp possible p ppp mp ppp mp ppp mp fff

Vla.

h. sul pont

ROTATE BOW

diagonal bow angle, nearly parallel to strings

senza sord.

at tip BRIDGE/ASP at frog AST at tip ASP at frog AST at tip ASP at frog AST at tip ASP at frog AST high bow speed at tip ASP at frog AST

(half-press trill)

poco port. ad libitum

glide fingers lightly up and down strings ad libitum
relatively slow bow speed, bow pressure ad libitum

use lateral and rotational bow motion when changing bow direction, keep sound even as possible

harm. gliss.

pppp possible pp pp p pp mf fff

Elec.

030 031 032

Vlc.

senza sord.

bow tailpiece

ASP h. sul pont

laterally

Top Nut

(half-press trill)

use lateral and rotational bow motion when changing bow direction, keep sound even as possible
circular bowing around bridge, so that with each rotation the bow glides above and below the bridge, arpeggiating all four strings on each side

glide fingers lightly up and down strings ad libitum

at frog BRIDGE/ASP at tip

laterally towards top nut

glide fingers lightly up and down strings ad libitum

bow on bridge and strings simultaneously,
diagonal bow angle, nearly parallel to strings
relatively slow bow speed, bow pressure and location ad libitum

harm. gliss.

p mp p mp pp pppp possible ppp mf ppp mf pp fff

Asymptotic Flux: First Study in Entropy

♩ = c.60-66

Y

101

B.Cl.

m. 96 84b - 86 - 87 - 89 - 90

m. 97 84b m. 98 84b

m. 97 84b m. 98 84b

Vln.

AST ASP AST

harm. gliss.

poco decel. event tempo poco accel. poco decel.

poco accel.

Vla.

AST ASP AST ASP AST

harm. gliss.

poco accel. event tempo poco decel. poco accel. decel.

poco accel.

Elec.

033

Vlc.

ORD ASP ST ASP ST

molto martellato

molto martellato

106

B.Cl.

Vln.

Vla.

Elec.

Vlc.

034

035

Asymptotic Flux: First Study in Entropy

BB

113

B.Cl.

Vln.

Vla.

Elec.

Vlc.

036

037

CC

116

m. 96

m. 97 84b

m. 96 84b

m. 96 84b

m. 97 84b

m. 96 84b

m.84b

"u" "eu" "u" "eu" "u" "eu"

poco accel. rean.

poco decel. trem.

poco

port.

dist.

bow alternately

legato

(half-press ad libitum)

at tip

SP ASP ST ORD

h. sul pont

119

DD

REPEAT ("FREE TIME")
(B.Cl. x5, Strings ad libitum)

EE

♩ = c.60-66

B.Cl.

Vln.

Vla.

Elec.

Vlc.

m. 96 ♯84b

m. 97 ♯84b

m. 54

m. 3

m. 71 (bisb. w/key 14)

038

039

port.

slap

(cracked)

gliss./rip

(prestissimo possibile)

poco decel. reart.

poco accel.

jagged fall ad libitum

dist., as gritty and dirty as possible

behind bridge

w/bow, lateral motion only!
move l.h. fingers on/off
& up/down neck ad libitum

make no attempt at
synchronization with other events!
speed should freely increase and
decrease individually

col legno
battuto

molto vib.

AST

ASP

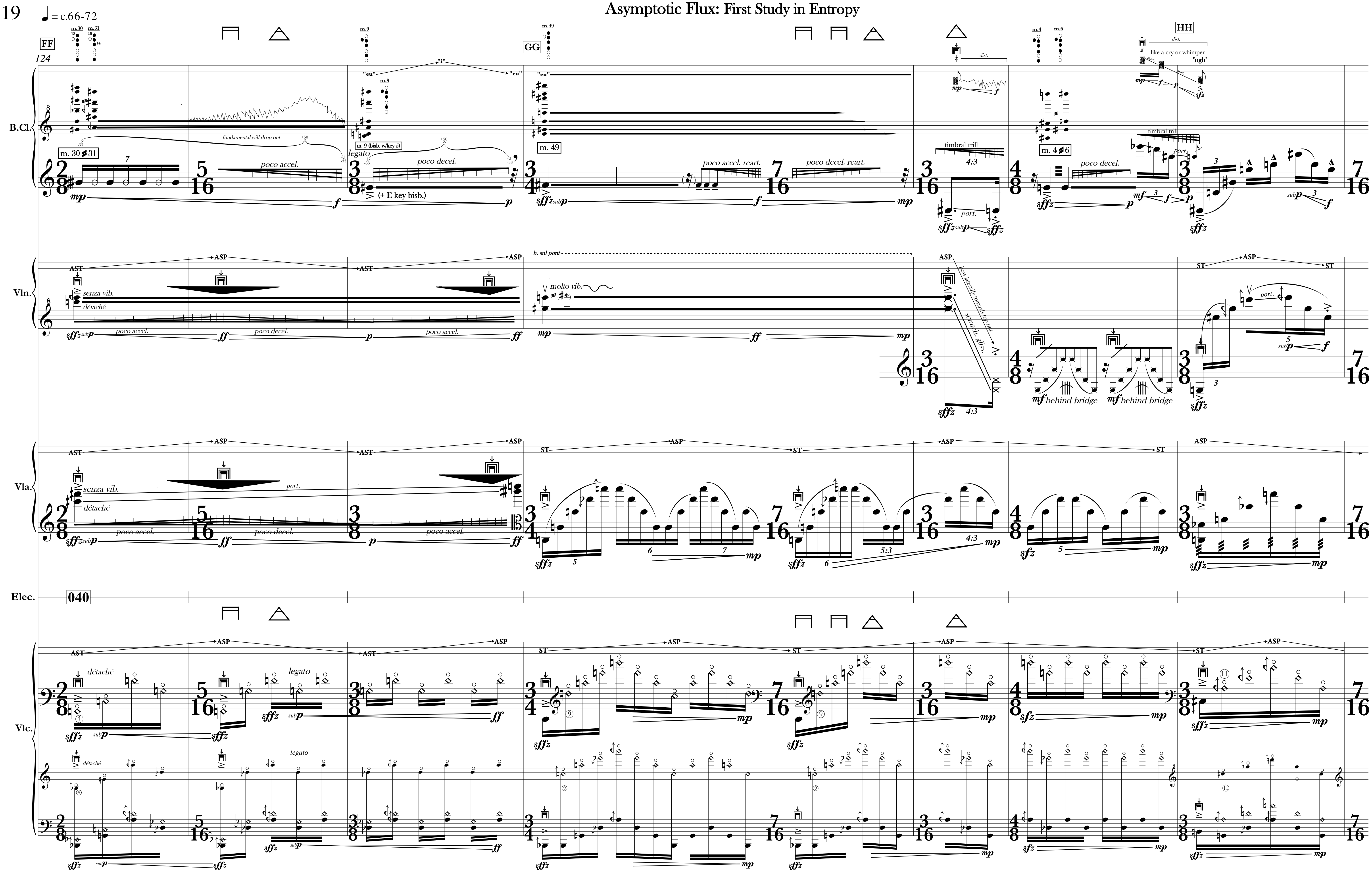
SP

ORD

ST

at tip

at frog


= c.66-72
FF
124
GG
HH
B.Cl.
Vln.
Vla.
Elec.
Vlc.
040
fundamental will drop out
m. 30 ≠ 31
m. 9 (bisb. w/key 5)
m. 49
m. 4 ≠ 6
legato
poco accel.
poco decel.
poco accel. reart.
poco decel. reart.
(+ E key bisb.)
timbral trill
like a cry or whimper
"ngh"
"eu"
"i"
dist.
port.
AST
ASP
ST
h. sul pont
senza vib.
détaché
molto vib.
scratch. gliss.
behind bridge
legato

132

B.Cl.

Vln.

Vla.

Elec.

Vlc.

m. 41

m. 41

m. 9

= c.60-66

heavy dist./scream

dist./break

m. 9 (bisb. w/key 5)

poco decel. bisb.

dist.

port.

ST

ASP

SP

at tip

BRIDGE/ASP

molto vib.

poco decel. vib. rate

senza vib.

possibile!

depression of strings II & III should allow for all four to be bowed simultaneously with very high pressure

8va

port.

poco accel.

poco decel.

diagonal bow angle, nearly parallel to strings
rotate bow ad libitum

(half-press)

harm. gliss.

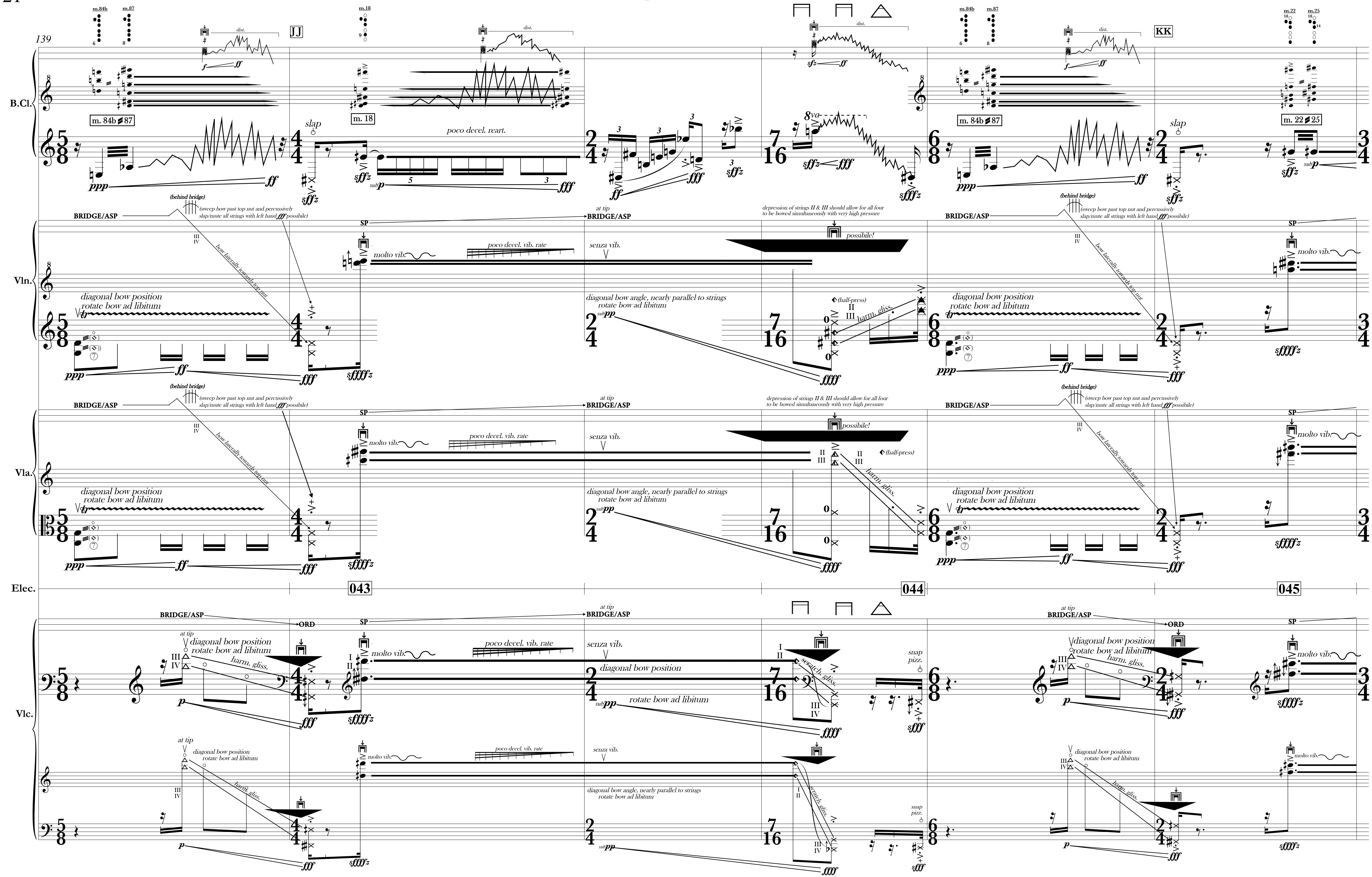
diagonal bow position

scratch gliss.

snap pizz.

041

042


139
JJ
KK
B.Cl.
Vln.
Vla.
Elec.
Vlc.
m. 84b
m.87
m.18
m.22
m.25
dist.
m. 84b⋰87
m. 18
m. 22⋰25
slap
poco decel. reart.
8va
(behind bridge)
(sweep bow past top nut and percussively slap/mute all strings with left hand fff possibile)
BRIDGE/ASP
SP
at tip
ORD
bow laterally towards top nut
molto vib.
poco decel. vib. rate
senza vib.
depression of strings II & III should allow for all four to be bowed simultaneously with very high pressure
possibile!
diagonal bow position
rotate bow ad libitum
diagonal bow angle, nearly parallel to strings
(half-press)
harm. gliss.
scratch. gliss.
snap pizz.
043
044
045

145

senza rit!

LL

MM

m.84b m.87

m.17 m.20

B.Cl.

dist.

poco decel. trem.

fff

fff ffff

sfffz fffff

m. 84b 87

ppp mf

heavy dist./scream

m. 17 20

fff

ffff

dist./break

sffz

quasi-slap

4:3

sffffz possibile!

Vln.

at tip

BRIDGE/ASP

poco decel. vib. rate

senza vib.

diagonal bow angle, nearly parallel to strings

rotate bow ad libitum

subpp

ffff

depression of strings II & III should allow for all four to be bowed simultaneously with very high pressure

possibile!

(half-press)

II III

harm. gliss.

diagonal bow position

rotate bow ad libitum

tr

sfff subppp

BRIDGE/ASP

SP

détaché

III

sffffz possibile!

ASP

behind bridge!

III IV

Vla.

at tip

BRIDGE/ASP

poco decel. vib. rate

senza vib.

diagonal bow angle, nearly parallel to strings

rotate bow ad libitum

subpp

ffff

depression of strings II & III should allow for all four to be bowed simultaneously with very high pressure

possibile!

(half-press)

II III

harm. gliss.

diagonal bow position

rotate bow ad libitum

tr

sfff subppp

BRIDGE/ASP

SP

détaché

sffffz possibile!

ASP

behind bridge!

III IV

Elec.

046

047

048

049

Vlc.

at tip

BRIDGE/ASP

poco decel. vib. rate

senza vib.

diagonal bow position

rotate bow ad libitum

subpp

ffff

scratch. gliss.

I II

III IV

sfff subppp

diagonal bow position

depression of strings II & III should allow bottom three to be bowed simultaneously with very high pressure

BRIDGE/ASP

SP

détaché

sffffz possibile!

ASP

behind bridge!

III IV

poco decel. vib. rate

senza vib.

diagonal bow angle, nearly parallel to strings

rotate bow ad libitum

subpp

ffff

scratch. gliss.

I II

III IV

diagonal bow position

sfff subppp

sffffz possibile!

III IV

*Dead stroke up bow behind bridge (at frog) on strings III & IV.
Simultaneously slap mute end of fingerboard with fingers of l.h., ffff

Paris / Budapest / Rochester, NY — June - September 12, 2012

Asymptotic Flux: First Study in Entropy for amplified bass clarinet, violin, viola, and cello was written over a three month period while traveling and hitchhiking throughout Europe, surrounding time spent attending at the IRCAM Manifeste Festival in Paris and the Internationales Musikinstitut Darmstadt. As one might imagine, composing with pencil and paper while constantly on the move can be rather cumbersome, having only short periods of time available to focus, and often taking place in awkward workspaces like cafes, restaurants, hostels, and the apartments of my various hosts. Most of these environments were not quiet, but rather quite busy and chaotic spaces (an element of the title, addressed below). My original intent when I set out writing was to explore the timbral possibilities of the bass clarinet, utilizing a variety of techniques to produce complex soundscapes and microtonal sonorities that would provide the germinal material for the work while unifying the ensemble. In addition to the carefully selected sonorities that are worked out through sampling and spectral analysis of several dozen multiphonics in various states, additional pitch content is generated through an acoustic analogue to a process known in electronic music as "single-sideband modulation," resulting in a series of combination tones made by adding two frequencies (for instance, the fundamental of a bass clarinet tone and an open string of the cello), to one another, producing a series that grows exponentially (i.e. 100Hz+200Hz=300Hz, 200Hz+300Hz=500Hz, etc.). The last element regarding organization of pitch material revolves around the scordatura tuning of the cello to the 3rd, 5th, 7th, and 11th partials of a virtual low E-flat fundamental (19.6Hz, slightly sharp), well below the range of the piano (and certainly the cello or bass clarinet). This allows the cellist to execute unique sonorities very rapidly and with a great deal of precision through the use of natural harmonics, which would otherwise not be possible. Many of the instrumental techniques in this work are employed explicitly to destabilize or distort the timbral qualities of each instrument, and require quite detailed notation and performance directions. However, once these techniques and their context within the work are understood, my hope is that it will be possible to play more freely within this syntax and with a more organic, or even improvisatory character. The use of vocalizations and amplification color the sound of the clarinet, and in fact modulate and destabilize the pitch further, rendering the written pitch material quite disfigured. The title comes from an arguably conceptual device: the low E-flat that simultaneously pervades the work and is non-existent. I imagine that the ensemble is always reaching towards this E-flat as a point of centricity, but they never quite arrive, much like an asymptote approaching infinity. Entropy itself can be described as the "measure of the disorder or randomness in a closed system," the "loss of information in a transmitted message," the "tendency for all matter and energy in the universe to evolve toward a state of inert uniformity," or the **"**inevitable and steady deterioration of a system or society" (source: American Heritage Dictionary). If I may be so bold as to take some poetic liberties in reducing the thermodynamic property of "entropy" to simply a unit of measurement for chaos, I might claim that this work is an attempt to convey a state of high entropy in music. In stark contrast both to much of my previous work and to the classical tradition itself, this is a characteristic that I feel reflects not only specific elements of the compositional process, but also the result of the technical demands made on the performers, as well as my state of mind throughout the creation of this work. The version with electronics was completed May 7, 2014 for a premiere at the NYC Electroacoustic Festival by the [Switch~ Ensemble] in June, 2014.

Jason Thorpe Buchanan's works have been described by critics and leading composers as "an unearthly collage of sounds", "sharply-edged", and "free jazz gone wrong", commissioned and performed internationally by conductors and ensembles such as Brad Lubman, Alan Pierson, Jean-Philippe Wurtz, Alarm Will Sound, Ensemble Interface (Germany), Ensemble Nikel (Israel), Ensemble Linea (France), Nonsemble 6, IKTUS Percussion, [Switch~ Ensemble], OSSIA, ensemble39, Brevard Music Center Orchestra, Fiati 5 (Italy), Sound ExChange Orchestra, Eastman Musica Nova Ensemble, and TAD Wind Symphony (Japan), among others. Nominated for the 2015 Gaudeamus Prize, three of his works will be presented at Gaudeamus Muziekweek in September 2015.

His Multimedia Opera *Hunger* was selected for the Darmstadt Contemporary Opera Workshop (2014), and recently selected for The Industry's FIRST TAKE Opera Workshop in Los Angeles (2015) with wild Up, and the MATA Interval 8 Series in New York City (2015) with the [Switch~ Ensemble] on a concert of new works for Ensemble & Multimedia curated by the composer. Awarded a Fulbright Fellowship (2010-11) at the Hochschule für Musik und Theater in Hamburg (Germany) as a visiting scholar, he was recently selected as Artist-in-Residence by USF Verftet and the City Council of Bergen, Norway to complete work on *Hunger* in late 2015. Additional honors and awards include the ASCAP Morton Gould Award (2014) and the Howard Hanson Orchestral Prize (2014) for *Asymptotic Flux: Second Study in Entropy* (2013) commissioned by the Mizzou International Composers Festival for Alarm Will Sound, *Double Concerto* (2014) commissioned by the International Horn Society for soloists Jeff Nelsen, Mike Walker, and the Eastman Musica Nova Ensemble with conductor Brad Lubman, *antistasis* (2014) for the Tzlil Meudcan Festival (Tel Aviv) with Ensemble Nikel, *oggetti 1* (2014) as composer-in-residence for Chamber Music Campania (Italy), both the newEar 4th Annual Composer's Competition (2013), and selection at the NYC Electroacoustic Music Festival (2014) for *Asymptotic Flux: First Study in Entropy* co-commissioned by the [Switch~ Ensemble] & OSSIA, 2nd place in the American Prize composition competition (2012) for *Berlin Songs*, commissioned by the German/American Fulbright-Kommission and premiered at the Akademie der Künste (Berlin) during the European Fulbright Conference, and winner of the 2014 International Iron Composer 5-hour composition competition in Cleveland, OH.

Jason has studied composition with Ricardo Zohn-Muldoon, Carlos Sánchez-Gutiérrez, Robert Morris, Allan Schindler, David Liptak, Virko Baley, Peter Michael Hamel, Jorge Grossmann, Pablo Furman, and Manfred Stahnke, conducting with Takayoshi Suzuki and Brad Lubman, and with Georges Aperghis, Brian Ferneyhough, Raphaël Cendo, Chaya Czernowin, Augusta Read Thomas, Hans Abrahamsen, Philippe Leroux, Clemens Gadenstätter, José María Sánchez-Verdú, and Pierluigi Billone, among others.

He is Coordinator of the Valencia International Performance Academy & Festival's Composition & Contemporary Music Program (Spain) and from 2007-2012 served as founder and director of Melos Music, a composer's consortium and concert series in Chicago, San Francisco, and Philadelphia. He has served as assistant conductor for Eastman's Musica Nova Ensemble with conductor Brad Lubman, Graduate Teaching Assistant/Course Instructor for the Eastman Computer Music Center, board member of Ossia, and co-founder, conductor, and artistic director of the ECMC's ensemble-in-residence, the [Switch~ Ensemble] as a Ph.D. candidate at the Eastman School of Music. He holds degrees in Composition and Music Technology from San José State University and the University of Nevada, Las Vegas, where he taught courses in composition and theory (2008-2010), receiving the highest honors from both institutions.

Current projects include *Hunger*, a multimedia opera with libretto by award-winning poet Darcie Dennigan, a work for saxophone and electronics to be premiered by Andrew J. Allen at the World Saxophone Congress (Strasbourg, 2015), a work for solo percussion and electronics to be premiered by Peter Ferry (Chicago, 2015), a commission from the New York Virtuoso Singers with conductor Harold Rosenbaum (NYC, 2015), a commission from the Blue Water Chamber Orchestra as winner of Iron Composer 2014 to be premiered May 2015 in Cleveland, and a commission for Slagwerk Den Haag to be premiered at Gaudeamus Muziekweek (Netherlands, Sept. 2015).

For more information or to contact the composer, please visit

www.jasonthorpebuchanan.com

or

MELOS MUSIC

www.melosmusic.com

ASYMPTOTIC FLUX: FIRST STUDY IN ENTROPY

September 25, 2012; Rev. 1 – Apr. 12, 2013

****Electronics completed May 7, 2014***