



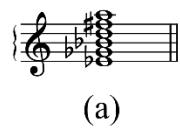
A JOURNAL OF THE SOCIETY FOR MUSIC THEORY

MTO 31.4 Examples: Moreira, Weird, Menacing, and Colorful

(Note: audio, video, and other interactive examples are only available online)

<https://www.mtosmt.org/issues/mto.25.31.4/mto.25.31.4.moreira.html>

Example 1. Polytonal harmonies in selected Hollywood movies: (a) Bernard Herrmann: “Roof-top” (*Vertigo*, 1958); (b) Max Steiner: “Knives” (*Arsenic and Old Lace*, 1944); (c) John Williams: “The Reunion” (*The War of the Worlds*, 2005); (d) Max Steiner: “Mrs. Hammond” (*The Letter*, 1940); (e) John Williams: “Far From Home” (*E. T.*, 1982)



(a)

(b)

(c)

(d)

(e)

Example 2. Bernard Herrmann, “The Delivery” (*It’s Alive*, [00:13:26–00:14:07])

4/4

Tubas Trombones Clarinets

Organ

ff

ff

Tim. v

ff

ff

11

Dm/G#m

Muted trumpets

Clarinets

Trombones

Tubas

sff

sff

sff

sff

Example 3. Bernard Herrmann, “The Scar” (*Sisters*, [00:15:48–00:16:53])

Score for Example 3 (Bernard Herrmann, “The Scar”):

Top Staff (Measures 1-6):

- Key: E♭m \ Am
- Measure 1: 3 Eng. Hns.
- Measure 2: 3 Cls.
- Measure 3: 2 Bass Cls. Contr. Cl.
- Measure 4: 3 Cls.
- Measure 5: 3 Cls.
- Measure 6: 2 Bass Cls. Contr. Cl.

Bottom Staff (Measures 1-6):

- Key: Dm \ A♭m
- Measure 1: 3 Eng. Hns.
- Measure 2: 3 Cls.
- Measure 3: 2 Bass Cls. Contr. Cl.
- Measure 4: 3 Cls.
- Measure 5: 3 Cls.
- Measure 6: 2 Bass Cls. Contr. Cl.

Transition (Measures 7-8):

- Key: Am \ E♭m
- Measure 7: Vlns.
- Measure 8: Vib.
- Measure 9: pp

Final Section (Measures 9-10):

- Key: A♭m \ Dm
- Measure 9: Vlns.
- Measure 10: Vib.
- Measure 11: pp

Example 4. Bernard Herrmann, “The Giant Crab” (*Mysterious Island*, [00:29:17–00:29:32])

Score for Example 4 (Bernard Herrmann, “The Giant Crab”):

Top Staff (Measures 1-3):

- Key: Em \ E♭m
- Measure 1: Cls.
- Measure 2: ff
- Measure 3: Bass Cls.

Middle Staff (Measures 1-3):

- Key: Cls. + Bsns.
- Measure 1: Bass Cls. + Bsns.
- Measure 2: Bass Cls. + Bsns.
- Measure 3: Bass Cls. + Bsns. + Vlas.

Bottom Staff (Measures 1-3):

- Key: Cls. + Bsns. + Vlas.
- Measure 1: Bass Cls. + Bsns. + Vlcs. & DBs.
- Measure 2: Hns.

Transition (Measures 4-5):

- Key: A♭m \ Gm
- Measure 4: Upper triad: 3 Tpts. (+ 3 Cls.)
- Measure 4: Lower triad: 3 Tbn. (+ 3 Eng. Hns.)
- Measure 5: Tubas + Vlcs. & DBs

Final Section (Measures 6-7):

- Key: Am \ G♯m

Example 5. Bernard Herrmann, “The Grenades” (*The Naked and the Dead*, [01:26:20–01:26:38])

A♭m\Dm

All notes with pattern: *sfp* — *ff*

Tpts.
Hns.
Tbns.
Tubas

Example 6. Bernard Herrmann, “The Pass” (*The Naked and the Dead*, [01:28:54–01:29:17])

A♭m\Gm

Tpts.

mp

sim.

Tbns.

mp

cup mutes

harmon mutes

F♯m\Gm

mp

mp

sim.

Example 7. Some polychords suggesting varying degrees of harmonic tension

(a) (b) (c) (d)

Example 8. The 48 bichordal classes under K-equivalence

Bichordal class (Murphy)	Bichordal class (Milhaud)	Example	Obs.	Bichordal class (Murphy)	Bichordal class (Milhaud)	Example	Obs.
M0M _K	————	CM\CM	Trivial	m0m _K	————	Cm\Cm	Trivial
M1M _K	I-A	CM\DbM		m1m _K	I-B	Cm\Dbm	
M2M _K	II-A	CM\DM		m2m _K	II-B	Cm\Dm	
M3M _K	III-A	CM\EbM		m3m _K	III-B	Cm\Ebm	
M4M _K	IV-A	CM\EM		m4m _K	IV-B	Cm\Em	
M5M _K	V-A	CM\FM		m5m _K	V-B	Cm\Fm	
M6M _K	VI-A	CM\F#M		m6m _K	VI-B	Cm\F#m	
M7M _K	VII-A	CM\GM		m7m _K	VII-B	Cm\Gm	
M8M _K	VIII-A	CM\AbM		m8m _K	VIII-B	Cm\Abm	
M9M _K	IX-A	CM\AM		m9m _K	IX-B	Cm\Am	
M10M _K	X-A	CM\BbM		m10m _K	X-B	Cm\Bbm	
M11M _K	XI-A	CM\BM		m11m _K	XI-B	Cm\Bm	
M0m _K	————	CM\Cm		m0M _K	————	Cm\CM	
M1m _K	I-C	CM\Dbm		m1M _K	I-D	Cm\DbM	
M2m _K	II-C	CM\DM		m2M _K	II-D	Cm\DM	
M3m _K	III-C	CM\Ebm		m3M _K	III-D	Cm\Ebm	
M4m _K	IV-C	CM\Em		m4M _K	IV-D	Cm\Em	
M5m _K	V-C	CM\Fm		m5M _K	V-D	Cm\Fm	
M6m _K	VI-C	CM\F#m		m6M _K	VI-D	Cm\F#m	
M7m _K	VII-C	CM\Gm		m7M _K	VII-D	Cm\Gm	
M8m _K	VIII-C	CM\Abm		m8M _K	VIII-D	Cm\Abm	
M9m _K	IX-C	CM\Am		m9M _K	IX-D	Cm\Am	
M10m _K	X-C	CM\Bbm		m10M _K	X-D	Cm\Bbm	
M11m _K	XI-C	CM\Bm		m11M _K	XI-D	Cm\Bm	

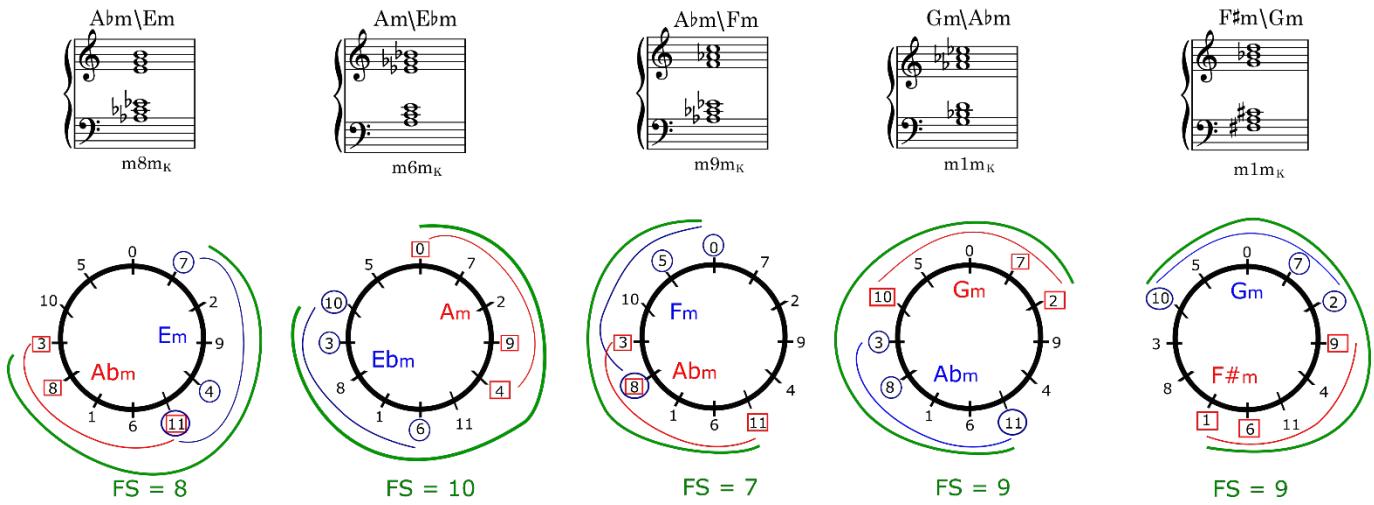
Example 9. The bichordal classes according to IRK, RK, and K equivalence

$M1M_{IRK}$	$M1M_{RK}$	$M1M_K$ $M11M_K$ $m1m_{RK}$ $m11m_K$	$M0m_{IRK}$	$M0m_{RK}$	$M0m_K$ $m0M_K$
$M2M_{IRK}$	$M2M_{RK}$	$M2M_K$ $M10M_K$ $m2m_{RK}$ $m10m_K$	$M1m_{IRK}$	$M1m_{RK}$	$M1m_K$ $m11M_K$
$M3M_{IRK}$	$M3M_{RK}$	$M3M_K$ $M9M_K$ $m3m_{RK}$ $m9m_K$	$M2m_{IRK}$	$M2m_{RK}$	$M2m_K$ $m10M_K$
$M4M_{IRK}$	$M4M_{RK}$	$M4M_K$ $M8M_K$ $m4m_{RK}$ $m8m_K$	$M3m_{IRK}$	$M3m_{RK}$	$M3m_K$ $m9M_K$
$M5M_{IRK}$	$M5M_{RK}$	$M5M_K$ $M7M_K$ $m5m_{RK}$ $m7m_K$	$M4m_{IRK}$	$M4m_{RK}$	$M4m_K$ $m8M_K$
$M6M_{IRK}$	$M6M_{RK}$	$M6M_K$	$M5m_{IRK}$	$M5m_{RK}$	$M5m_K$ $m7M_K$
	$m6m_{RK}$	$m6m_K$	$M6m_{IRK}$	$M6m_{RK}$	$M6m_K$ $m6M_K$
			$M7m_{IRK}$	$M7m_{RK}$	$M7m_K$ $m5M_K$
			$M8m_{IRK}$	$M8m_{RK}$	$M8m_K$ $m4M_K$
			$M9m_{IRK}$	$M9m_{RK}$	$M9m_K$ $m3M_K$
			$M10m_{IRK}$	$M10m_{RK}$	$M10m_K$ $m2M_K$
			$M11m_{IRK}$	$M11m_{RK}$	$M11m_K$ $m1M_K$

Example 10. Bernard Herrmann, “The Window” (*Sisters*, [00:28:25–00:29:11])

The musical score for Example 10 consists of four staves. The top staff is for the piano, showing sustained notes and chords. The second staff is for three clarinets (3 Cls.), the third for three bassoons (3 Hns.), and the bottom staff for a vibraphone (Vib.). The score is in 4/4 time. Dynamic markings include pp (pianissimo) and bass dynamic (for the woodwinds). Performance instructions like "Vib.", "3 Cls.", and "3 Hns." are also present. The piano part features sustained notes and chords, while the woodwind parts play eighth-note patterns. The score is in F major with a key signature of one sharp.

Example 11. Herrmann's polychords (from “The Window,” *Sisters*) in the circle of fifths



Example 12. The fifth span of all bichords as a measure of harmonic dissonance

RK class	K classes	FS	RK class	K classes	FS
M1M _{RK}	M1M _K , M11M _K	9	M0m _{RK}	M0m _K , m0M _K	7
M2M _{RK}	M2M _K , M10M _K	6	M1m _{RK}	M1m _K , m11M _K	8
M3M _{RK}	M3M _K , M9M _K	7	M2m _{RK}	M2m _K , m10M _K	5
M4M _{RK}	M4M _K , M8M _K	8	M3m _{RK}	M3m _K , m9M _K	10
M5M _{RK}	M5M _K , M7M _K	5	M4m _{RK}	M4m _K , m8M _K	5
M6M _{RK}	M6M _K	10	M5m _{RK}	M5m _K , m7M _K	8
m1m _{RK}	m1m _K , m11m _K	9	M6m _{RK}	M6m _K , m6M _K	7
m2m _{RK}	m2m _K , m10m _K	6	M7m _{RK}	M7m _K , m5M _K	6
m3m _{RK}	m3m _K , m9m _K	7	M8m _{RK}	M8m _K , m4M _K	9
m4m _{RK}	m4m _K , m8m _K	8	M9m _{RK}	M9m _K , m3M _K	4
m5m _{RK}	m5m _K , m7m _K	5	M10m _{RK}	M10m _K , m2M _K	9
m6m _{RK}	m6m _K	10	M11m _{RK}	M11m _K , m11M _K	6

Example 13. Bernard Herrmann, “The Bedroom” (*Cape Fear*, [00:33:33–00:34:05])

6 solo Doublebasses (all with vibrato)

B^o\Abm F#M\Am GM\GbM AbM\GM F#M\Em Em\Ebm

M3m_K M11M_K M11M_K M10m_K m11m_K

B^o\Abm F#M\Am GM\GbM AbM\GM F#M\Em Em\Ebm

FS = 10 FS = 10 FS = 9 FS = 9 FS = 9 FS = 9

Example 14. Instances of ro1 and ro11 in selected bichords from *Sisters* (on the left) and *Cape Fear* (on the right)

Abm\Em F#m\Gm F#M\Am Em\Ebm

Example 15. Bernard Herrmann, “The Snake” (*The Naked and the Dead*, [01:20:00–01:20:18])

6

Gm\A_bm
3 Tpts. (cup mutes)

3 Tpts. (hard mutes)

3 Tbn. (cup mutes)

8 Horns

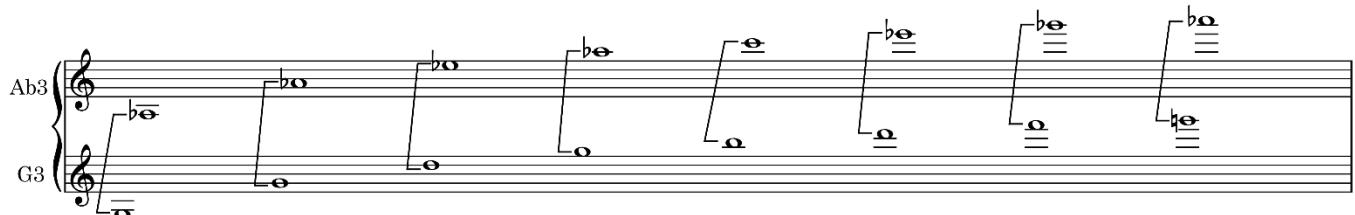
Bsn. and Ctrbsn.

Harps (with pedal glissando)

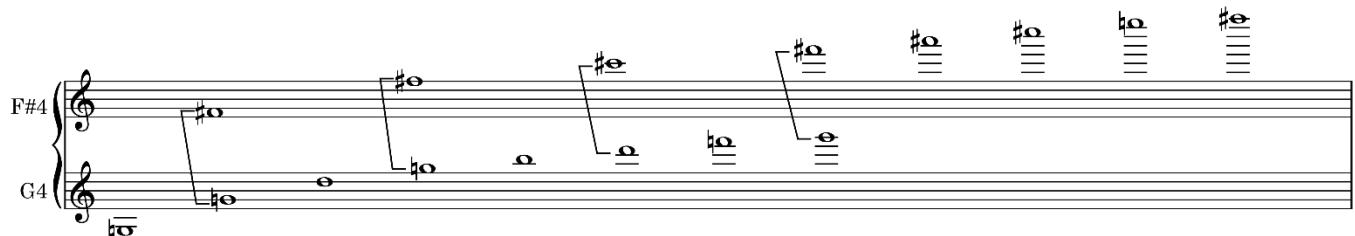
A_bm\Gm Am\A_bm B_bm\Am Bm\B_bm

6 Tbn. Hps. and Tubas

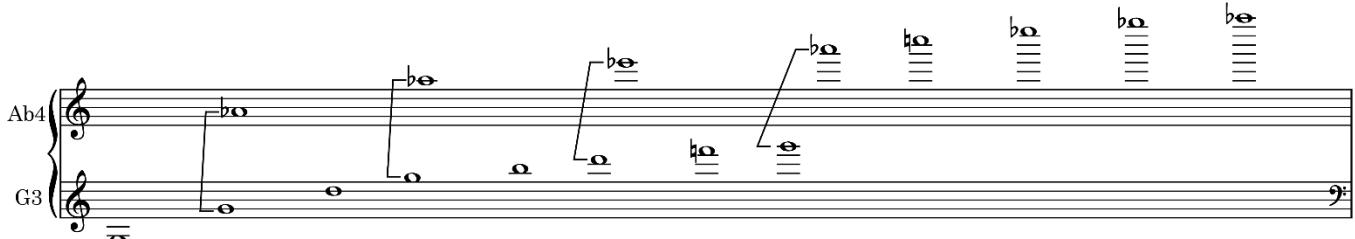
Example 16. Beating between ic1-related harmonic spectra (with 8 partials each in this abstract example)



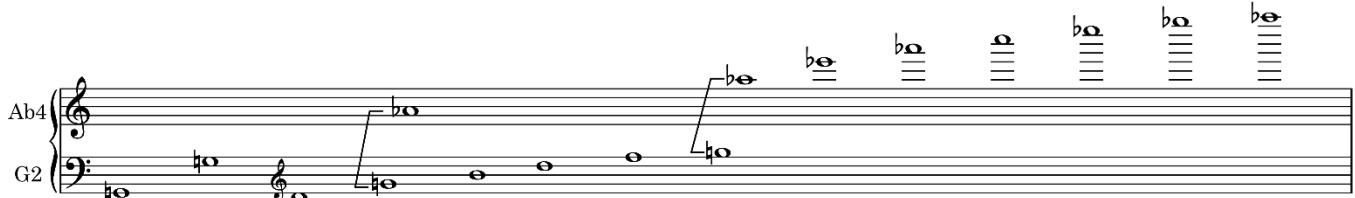
(a) Beating between the partials of two harmonic spectra separated by i1, the pitch interval of 1 semitone.



(b) Beating between the partials of two harmonic spectra separated by i11, the pitch interval of 11 semitones.



(c) Beating between the partials of two harmonic spectra separated by i13, the pitch interval of 13 semitones.



(d) Beating between the partials of two harmonic spectra separated by i25, the pitch interval of 25 semitones.

Example 17. Igor Stravinsky, “The Shrovetide Fair,” mm. 41–53 (*Petrouchka*)

Vivace
fff

Example 18. William Schuman, *Three-Score Set* for piano solo, II, mm. 1–4

Example 19. Igor Stravinsky, “Danses des Adolescentes,” mm. 1–8 (*The Rite of Spring*)

Example 20. Bernard Herrmann, “The House” (*North by Northwest*, [01:50:44–01:50:57])

Example 21. Bernard Herrmann, “The Cliff” (*North by Northwest*, [02:08:58–02:09:14])

Woodwinds & Tuba Cm\Bm

Em\Ebm

Tpts. Hns. Tbn.

Tim.

ff

m11m_K

Tpts. Hns. Tbn.

Tim.

ff

m11m_K

4

Abm\Gm

Tpts. Hns. Tbn.

Tim.

m11m_K

Ebm\DM

Tpts. Hns. Tbn.

Tim.

m11m_K

m11M_K

Example 22. Bernard Herrmann, “The Couch” (*Sisters*, [00:55:12–00:55:19]): (a) Herrmann’s polyharmony as the superimposition of four instrumental groups (b) Herrmann’s polyharmony as the superimposition of two half-diminished chords (c) The half-diminished motive in the “Prelude” [00:00:00–00:00:04]

3 Clarinets

3 English Horns

4 Horns

2 Bass Clarinets

pp

pp

pp

pp

(a)

B \flat 7 \ C \flat 7

Clarinet

English Horn

Horn

Bass Clarinet

(b)

C \flat 7 B \flat 7 C \flat 7 B \flat 7

2 Horns & 3 English Horns

2 Horns & 3 Clarinets

fff fff sim.

2 Horns & 3 Clarinets

fff fff sim.

(c)

Example 23. Sharp-dissonance vector (SDV) and fifth span (FS) for: (a) the first polychord from “Scar” (b) the polychord from “The Couch”

(a)

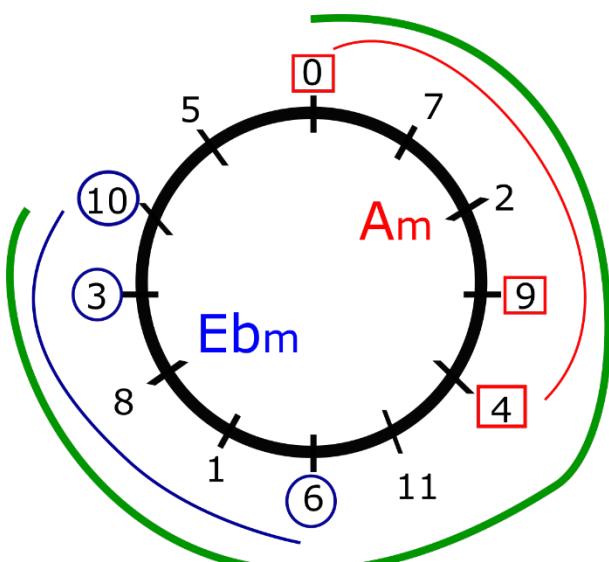
E \flat m\Am

m6m_K

(b)

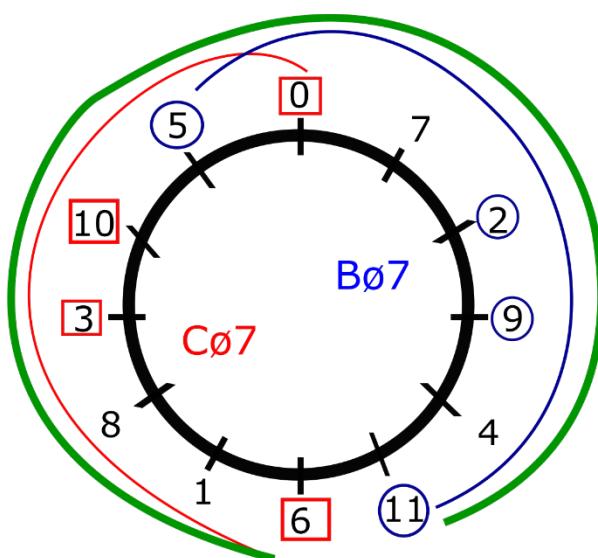
B \emptyset 7\C \emptyset 7

SDV: < $\begin{smallmatrix} 110 \\ 00 \end{smallmatrix}$ >



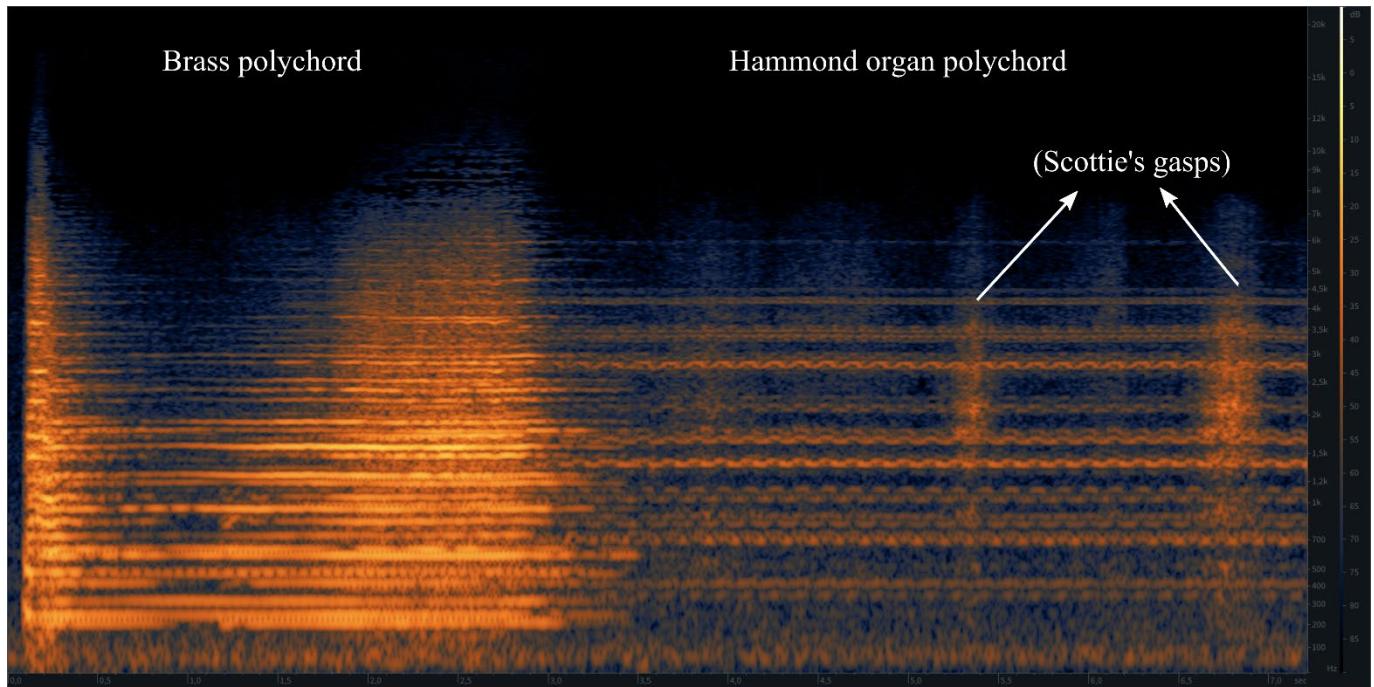
FS = 10

SDV: < $\begin{smallmatrix} 400 \\ 00 \end{smallmatrix}$ >



FS = 11

Example 24. Bernard Herrmann: “The Window” (*Vertigo*, [00:11:05–00:11:13])



$A\flat m \setminus Gm$ $Fm \setminus F\sharp m$
 Hammond organ

3 **3**

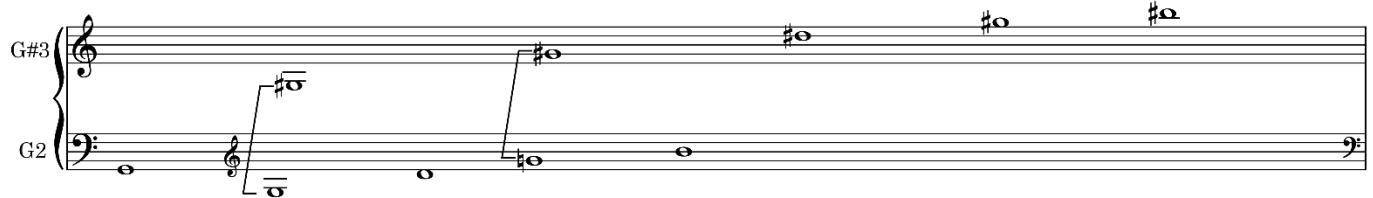
pp

Trumpets
 >
sfp ————— **sff**
 Trombones
 >
b

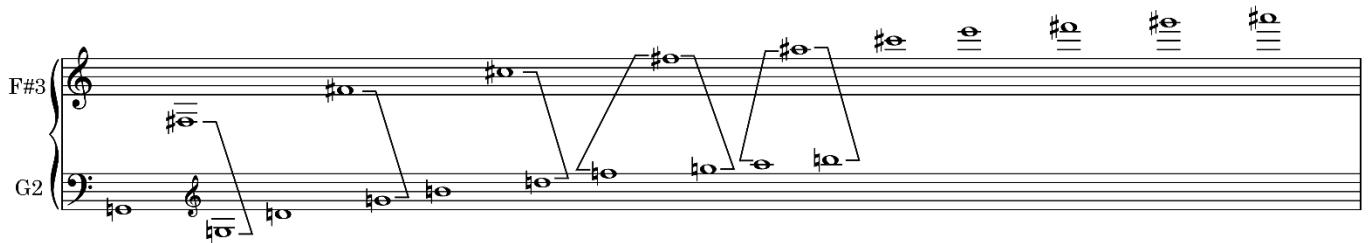
3

The musical score consists of two staves. The top staff is in treble clef, 3/4 time, and A-flat major (A-flat, C, E-flat, G). The bottom staff is in bass clef, 3/4 time, and F major (F, A, C, E). The score indicates a dynamic of **pp** (pianississimo). The brass polychord is represented by a horizontal line with vertical stems. The Hammond organ polychord is represented by a horizontal line with vertical stems. The score also includes dynamics **sfp** (sforzando piano) and **sff** (sforzando forte) for the brass, and dynamics **b** (bass) for the organ. The score is divided into two sections by a vertical bar, with the organ section starting at approximately 4.8 seconds.

Example 25. Abstract illustration of how a richer acoustic spectrum tends to imply more auditory roughness

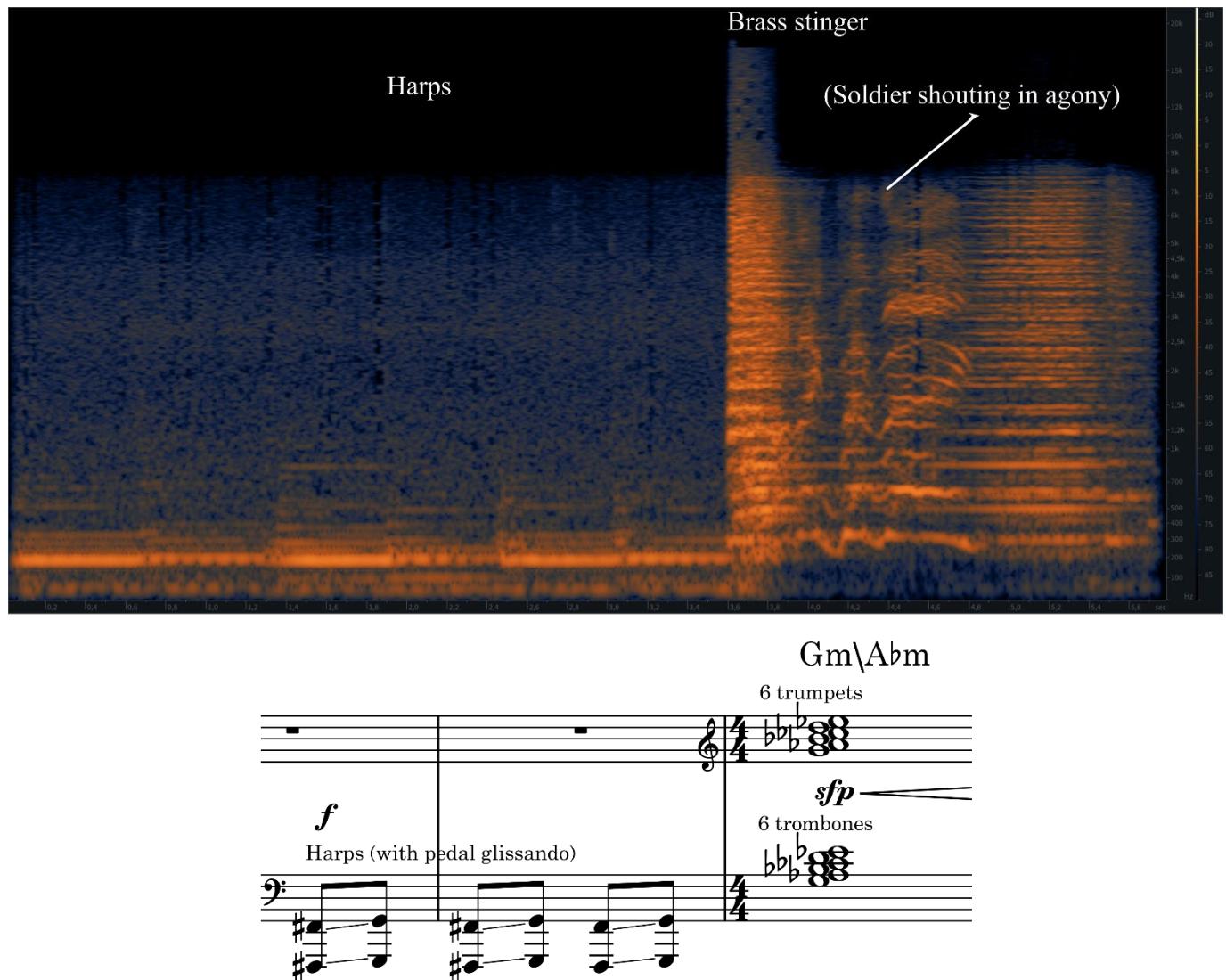


(a) Beating between the partials of two i18-related harmonic spectra with only 5 overtones each.

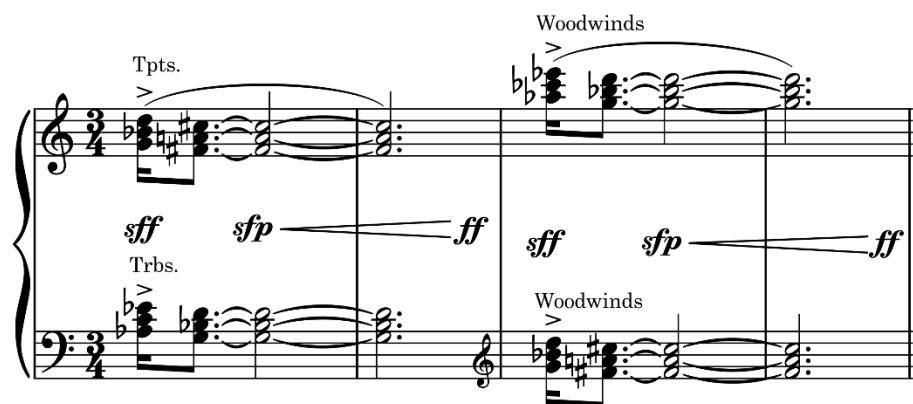
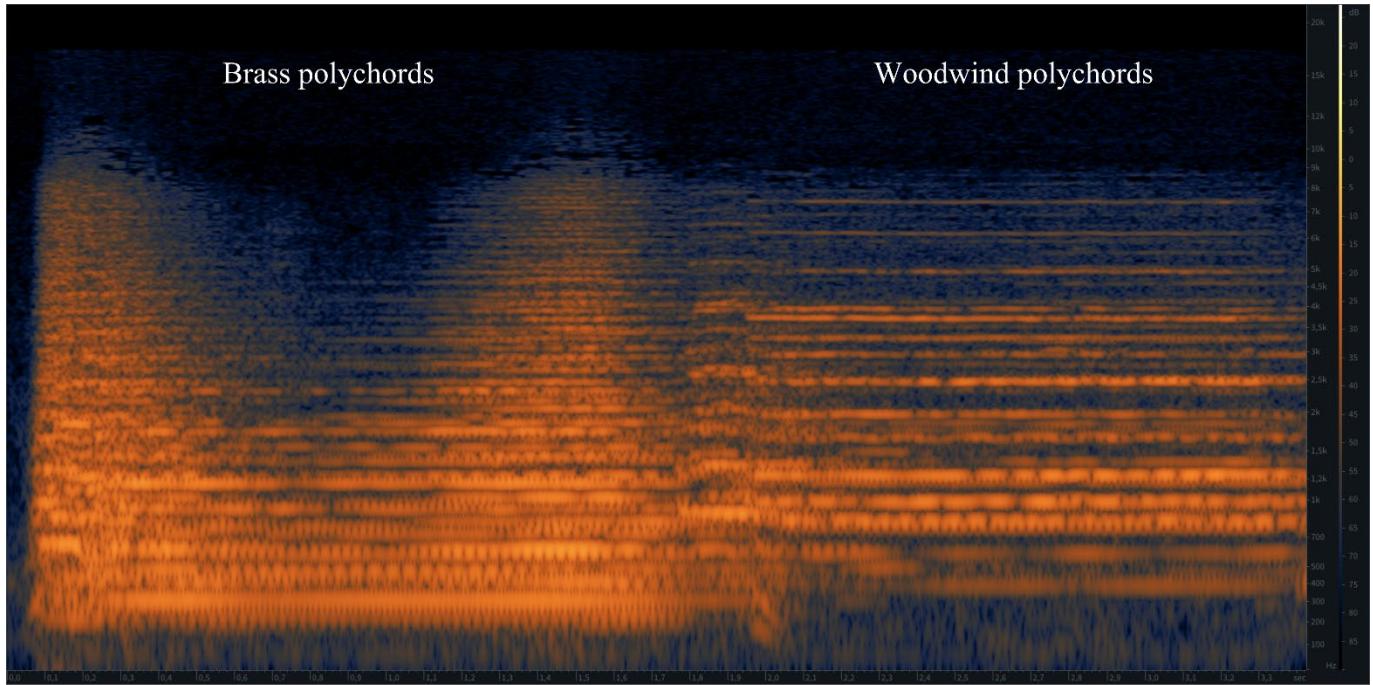


(b) Beating between the partials of two i11-related harmonic spectra with 10 overtones each.

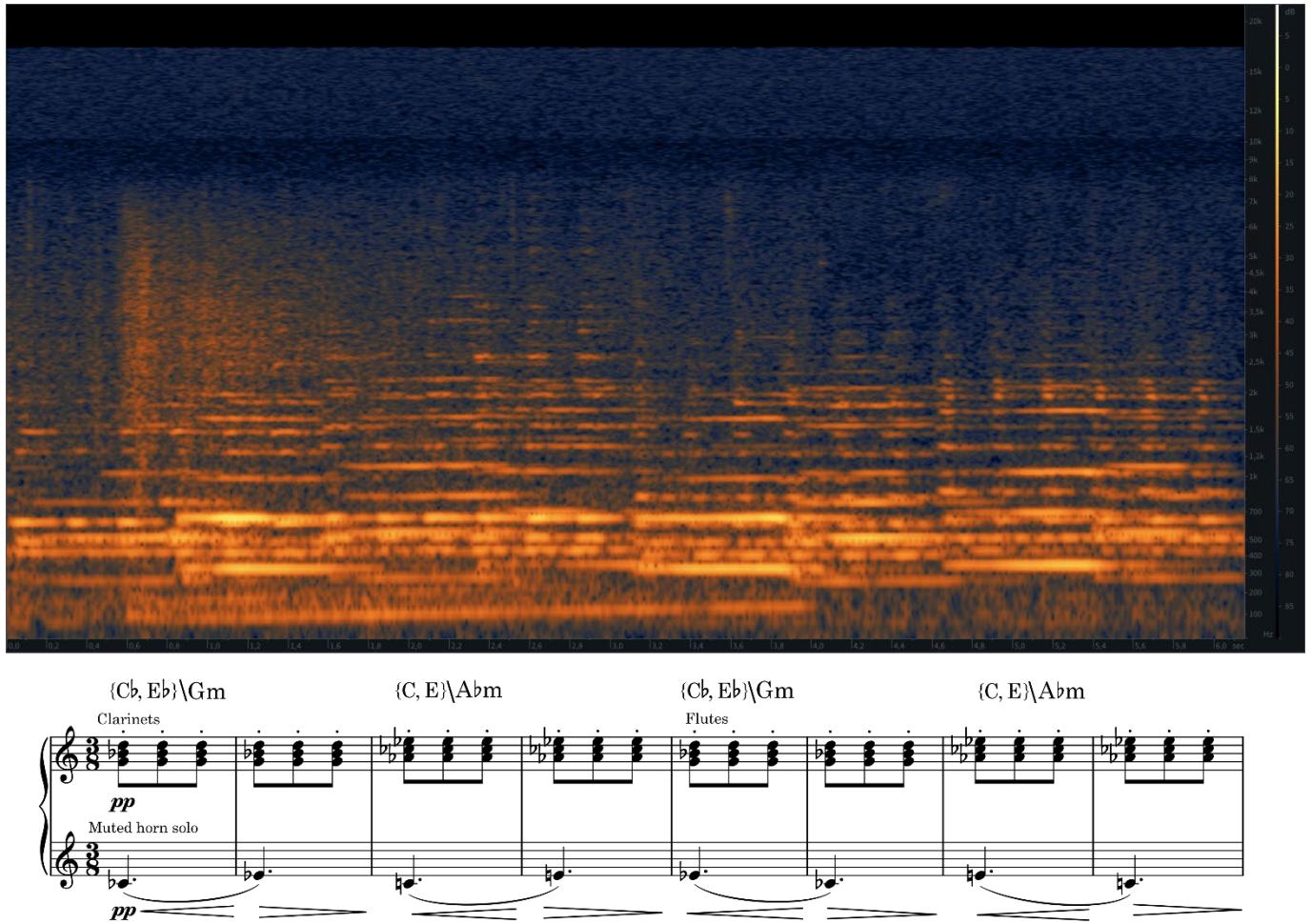
Example 26. Bernard Herrmann: “The Snake” (*The Naked and the Dead*, [01:20:04–01:20:09])



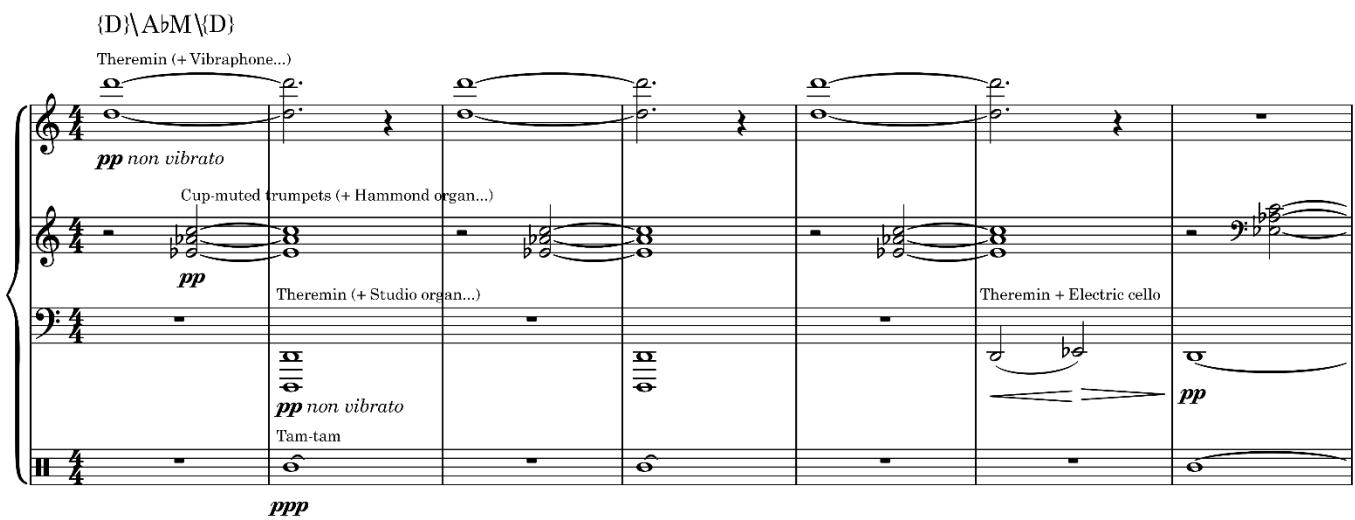
Example 27. Bernard Herrmann: “The Knife” (*North by Northwest*, [00:36:20–00:36:28])



Example 28. Bernard Herrmann: “The House” (*North by Northwest*, [01:50:44–01:50:51])



Example 29. Bernard Herrmann: “Klaatu” (*The Day the Earth Stood Still*, [00:07:57–00:08:38])



Example 30. Bernard Herrmann: “The Ray” (*The Day the Earth Stood Still*, [00:11:12–00:11:54])

A♭m \ Dm

Trumpets
Hammond organ

Trombones
Hammond organ

Piano

Chimes

Cymbals

Cymbals + Tam-tam + Bass drum

NOTE: Each of the four bars is heard in the movie as the combination of two superimposed tracks, one with the natural performance, the other one in reverse (as a result of electronic processing). The whole texture is superimposed on top of another cue, labeled "The Visor" in the score. The latter cue is much softer, so that it is completely covered when the sudden stingers of "The Ray" are heard.

Example 31. Sharp-dissonance vector (SDV) and fifth span (FS) for: (a) “Klaatu” (b) “The Ray”

(a)

$\{D\} \setminus A\flat M \setminus \{D\}$

i25 i23

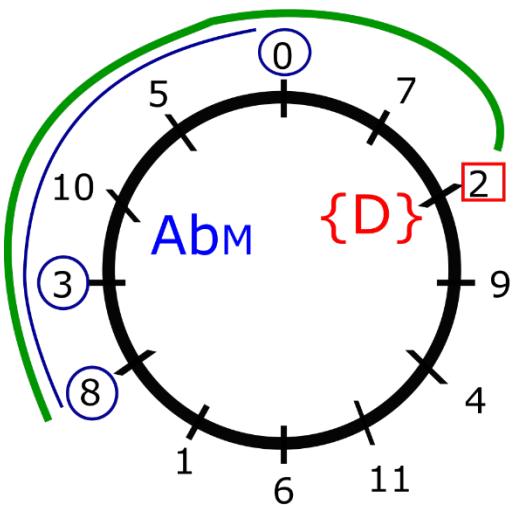
(b)

$A\flat m \setminus Dm$

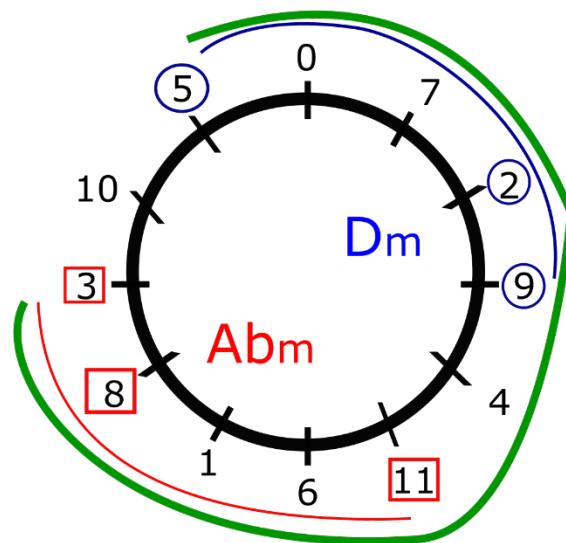
i13 8 i1

SDV: $\begin{pmatrix} 0 & 0 & 1 \\ & 0 & 1 \end{pmatrix}$

SDV: $\begin{pmatrix} 1 & 1 & 0 \\ 0 & 0 \end{pmatrix}$

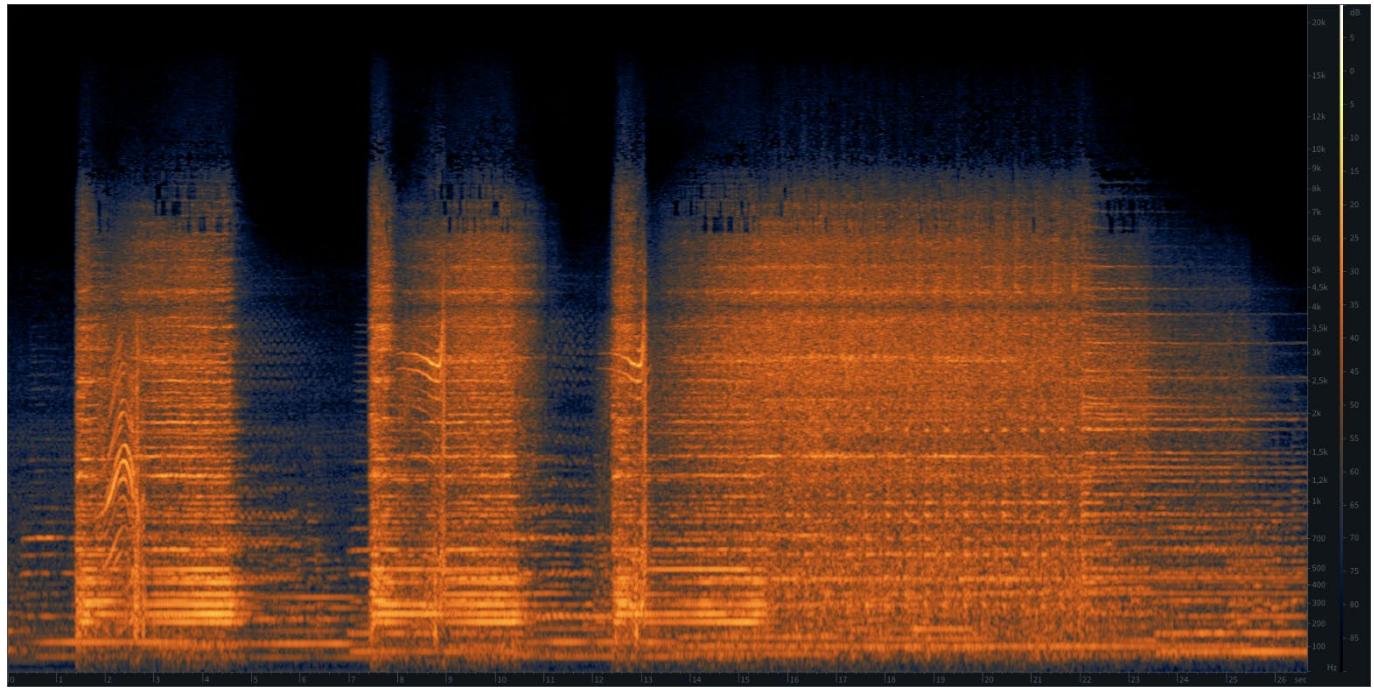


FS = 6

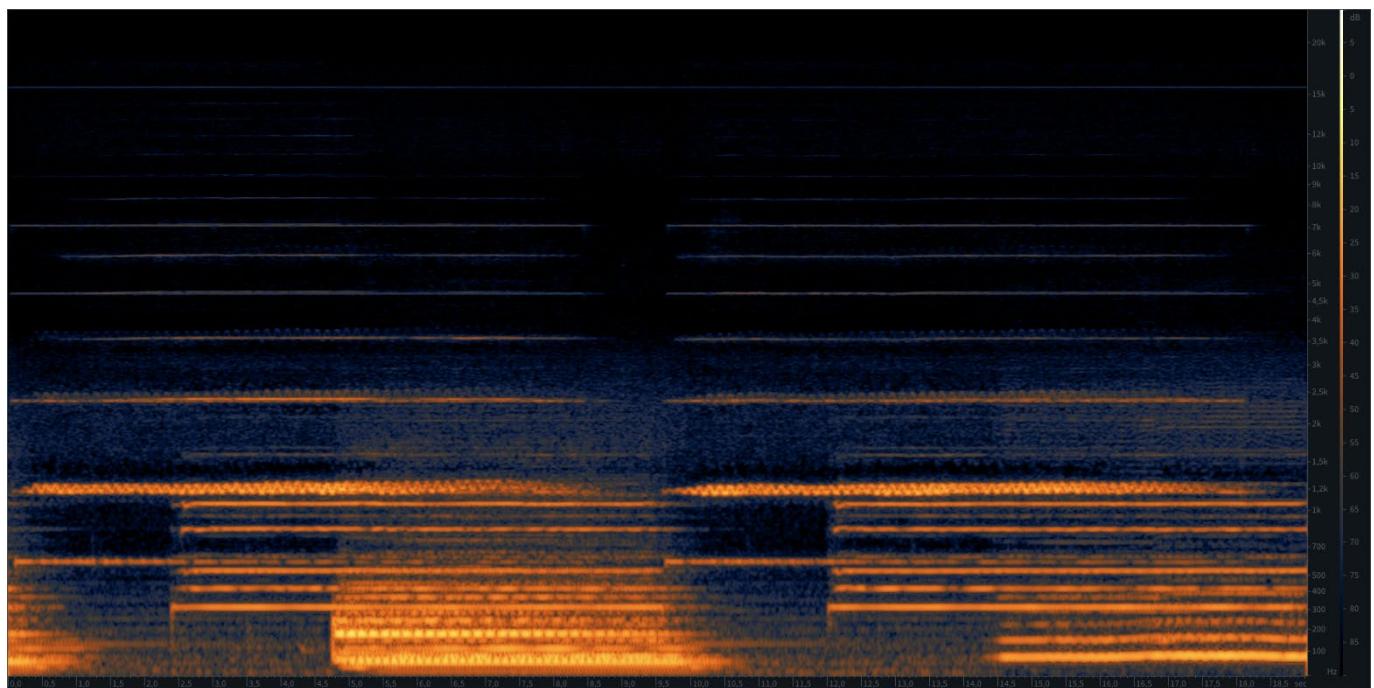


FS = 10

Example 32. Spectrogram for “The Ray” (corresponding to mm. 1–5 in Example 30)



Example 33. Spectrogram for “Klaatu” (corresponding to mm. 3–7 in Example 29)



Example 34. A summary of the comparative analysis of “Klaatu” and “The Ray”

	Klaatu’s polyharmony (“Klaatu”)	Gort’s polyharmony (“The Ray”)
Degree of chromaticism (fifth span)	-	+
Pitch dissonance (sharp-dissonance vector)	-	+
Fusion of the perceived texture	-	+
Timbral harshness	-	+