

Robert Guthrie

Spectra

for Chamber Orchestra

duration: 14 minutes

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Spectra

Instrumentation

Flute
Clarinet in B flat (Bass Clarinet in B flat)
Bassoon

Horn in F
Trombone

Piano

2 Violins
Viola
Cello
Double Bass

Duration: 14 minutes

Score in C

Programme Note

Spectra is a set of seven miniatures for chamber orchestra exploring possibilities for harmonic movement in an atonal context. Based on permutations of Messiaen's modes of limited transposition, pitch material throughout is developed and manipulated through various generative techniques inspired by post-serialism, complexity and minimalism.

Each miniature takes its title and aesthetic inspiration from a band of the electromagnetic spectrum, in ascending order of frequency:

Radio
Microwave
Infrared
Visible Light
Ultraviolet
X-Ray
Gamma

The bandwidth of each determined durations, whilst musical 'waves,' internal structures and the generation of material are based on specific frequencies and their relative wavelengths throughout.

Performance notes

In *Radio*, each note is to be held for the duration indicated by the time markers, creating a very slow wave of harmonic change throughout the piece. Breathing and bowing should be smooth and seamless as possible. Breath or bow changes should not align with other players to minimise gaps.

Spectra

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Radio

Score in C

The score is presented in a standard musical notation format with a common time signature (C). The instruments and their starting notes are as follows:

- Bass Clarinet in B \flat** : Starts on G \flat (B \flat 4).
- Bassoon**: Starts on G \flat (B \flat 3).
- Horn in F**: Starts on F \flat (B \flat 3).
- Trombone**: Starts on G \flat (B \flat 3).
- Violin 1**: Starts on G \flat (B \flat 4).
- Violin 2**: Starts on G \flat (B \flat 3).
- Viola**: Starts on G \flat (B \flat 3).
- Violoncello**: Starts on G \flat (B \flat 3).
- Double Bass**: Starts on G \flat (B \flat 2).

The score is marked with a dynamic of *p* (piano) at the beginning of each instrument's line. The time axis is marked in seconds from 0'' to 2'10'' in 10-second increments.

2'20" 2'30" 2'40" 2'30" 2'40" 2'50" 3'00" 3'10" 3'20" 3'40" 3'50" 4'00" 4'10" 4'20" 4'30"

The image displays a musical score consisting of four systems of staves. Each system contains two staves, one with a treble clef and one with a bass clef. The notes are represented by dots on the staves, with some notes including a flat symbol (b). The first system has a note on the treble staff at 4'00" and a note on the bass staff at 2'40". The second system has notes on both staves at 2'30" and 3'40". The third system has notes on both staves at 4'10". The fourth system has notes on both staves at 2'40" and 2'50".

2'20" 2'30" 2'40" 2'30" 2'40" 2'50" 3'00" 3'10" 3'20" 3'40" 3'50" 4'00" 4'10" 4'20" 4'30"

Microwave

4

1 $\text{♩} = 55$

Fl. *sfp* *mf* *mf*

Cl. *pp* *p* *mf*

Bsn. *pp* *p* *mf* *mp*

Hn. *pp* *mf* *p* *p* *mf*

Tbn. *p* *p* *p*

Pno. *mf* *pp* *p*

Vln. 1 $\text{♩} = 55$ *ppp* *gliss.* *p* *gliss.*

Vln. 2 *ppp* *gliss.* *p* *mp*

Vla. *pp* *gliss.* *mp* *mp*

Vc. *pp* *p* *mf* *f* *gliss.*

Db. *pp* *mf*

Detailed description: This is a page of a musical score for the piece 'Microwave'. The score is written for a full orchestra and includes parts for Flute (Fl.), Clarinet (Cl.), Bassoon (Bsn.), Horn (Hn.), Trombone (Tbn.), Piano (Pno.), Violin 1 (Vln. 1), Violin 2 (Vln. 2), Viola (Vla.), Violoncello (Vc.), and Double Bass (Db.). The music is in 4/4 time with a tempo of quarter note = 55. The score begins with a first ending bracket. The Flute part starts with a *sfp* dynamic and features a triplet of eighth notes. The Clarinet and Bassoon parts have *pp* dynamics. The Horn and Trombone parts have *pp* dynamics. The Piano part has *mf* dynamics. The Violin 1 and 2 parts have *ppp* dynamics and include glissando markings. The Viola part has *pp* dynamics. The Violoncello part has *pp* dynamics and includes a triplet of eighth notes. The Double Bass part has *pp* dynamics. The score includes various dynamic markings such as *mf*, *p*, *mp*, *f*, and *gliss.* throughout the piece.

12

Fl. *mf* *mp*

Cl. *mp*

Bsn. *mp*

Hn. *mf* *mf*

Tbn.

Pno. *mf* *p*

Vln. 1 *pp* *gliss.*

Vln. 2 *pp* *gliss.* *pp*

Vla. *pp* *gliss.*

Vc. *pp* *pp*

Db. *p* *p*

Detailed description: This page of a musical score covers measures 12 through 17. The woodwind section includes Flute (Fl.), Clarinet (Cl.), Bassoon (Bsn.), Horn (Hn.), and Trombone (Tbn.). The string section includes Violin 1 (Vln. 1), Violin 2 (Vln. 2), Viola (Vla.), Violoncello (Vc.), and Double Bass (Db.). The Piano (Pno.) part is also present. The score features various dynamics such as *mf* (mezzo-forte), *mp* (mezzo-piano), *pp* (pianissimo), and *p* (piano). Performance techniques like glissandos (*gliss.*) are indicated for the strings. The Flute and Clarinet parts have melodic lines with slurs and ties. The strings play sustained chords with some glissando effects. The Piano part has a melodic line in the right hand and a bass line in the left hand.

12

Fl. *sfp* *f* *ff* *f* *sfp* *ff*

Cl. *pp* *mf* *ff* *f* *f* *mp*

Bsn. *mf* *ff*

Hn. straight mute. *f* *ff* *ff* *ff* *sfp* *ff* cup mute. *mf*

Tbn. *f* *ff* *ff* *ff* *ff* *mf*

Pno. *mf* *ff* *mp* *p*

Vln. 1 *ff* *f* *s.p.* *gliss.*

Vln. 2 *mf* *mf* *ff* *mf* *gliss.*

Vla. *pp* *gliss.* *gliss.* *sfp* *ff* *pizz.* *ff* *arco.* *p*

Vc. *f* *ff* *ff* *ff* *ff* *pizz.* *ff* *arco.* *p*

Db. *ff* *ff* *ff* *ff* *ff* *ff* *ff*

21

Fl. *mf* *f* *f*

Cl. *mf* *f*

Bsn. *f*

Hn. *p* *pp*

Tbn. *pp* *f* senza sord.

Pno.

Vln. 1 *pp* *mf* *f*

Vln. 2 *mp* *f*

Vla. *pp* *sfp* *mp* *f*

Vc. *f* *f* *p* *mf*

Db. *f*

Visible light

1 $\text{♩} = 60$

Fl. mp ppp p mp

Cl. p mp mf

Bsn. p

Hn. mf sf

Tbn. p

Pno. p p

Vln. 1 mp

Vln. 2 mp p

Vla. pp

Vc. p pizz. f

Db. mf arco. p

Detailed description: This page of a musical score, titled 'Visible light', is page 11 of a larger work. It features a full orchestral ensemble including woodwinds (Flute, Clarinet, Bassoon, Horn, Trombone), strings (Violin 1 & 2, Viola, Violoncello, Double Bass), and Piano. The score is in 4/4 time with a tempo of quarter note = 60. The key signature has one flat (B-flat). The music is divided into four measures. The Flute part begins with a triplet of eighth notes marked *mp*, followed by a *ppp* dynamic, then a *p* dynamic, and finally a *mp* dynamic. The Clarinet part has a *p* dynamic triplet, followed by *mp* and *mf*. The Bassoon part has a *p* dynamic. The Horn part has a *mf* dynamic triplet, followed by a *sf* dynamic. The Trombone part has a *p* dynamic. The Piano part has a *p* dynamic in the first measure and a *p* dynamic in the third measure. The Violin 1 part has a *mp* dynamic triplet. The Violin 2 part has a *mp* dynamic in the first measure and a *p* dynamic in the third measure. The Viola part has a *pp* dynamic. The Violoncello part has a *p* dynamic, followed by *pizz.* *f*. The Double Bass part has a *mf* dynamic, followed by *pizz.* and then *arco.* *p*.

Ultraviolet

12

1 $\text{♩} = 90$

Fl. *mf* < *pp* < *mp* < *f* *mp* *f* *mf* ³ *p* *mp*

Cl. *mf* *pp* < *p* < *pp* *mp* < *mf* < *f* *p*

Bsn. *mf* *f* *p* *f* *mp* *p* < *mf* *p* < *mf* *f* *mf*

Hn. *p* < *mf* *p* *mf* *ff* *p* *p* < *mf*

Tbn. *mf* *p* < *f* *mp* < *mf*

Vln. 1 $\text{♩} = 90$ *pizz.* *p* *arco* *pp* *pizz.* *p* *mp* ³ *p* *mf* *f*

Vln. 2 *p* *mp* *pizz.* *arco* *p* *f* *mf* *mf* < *ff*

Vla. *mp* *mf* *ff* *mp* *p* *pp*

Vc. *arco* *p* *pizz.* *f* *ff* *mf* *p* *f* *p* *mf* *mp* ³

Db. *pizz.* *arco* *mf* *f* *f* *sfz* *pp* *p*

14

Fl. *mp* *flz.* *mf* *norm.*

Cl.

Bsn. *f* *mf* *mf*

Hn. *p*

Tbn. *f* *p*

Vln. 1

Vln. 2 *arco.* *mp* *f* *pizz.* *mf* *arco.* *tr.*

Vla. *f*

Vc. *p* *arco.* *p*

Db. *pizz.* *f* *pp*

19

Fl. *pp* *f* *mp* *f* *p*

Cl. *mf* *p* *mp* *mf*

Bsn. *f* *p* *p*

Hn. *p* *p* *f* *p*

Tbn. *p* *p* *mp*

Vln. 1 *pizz.* *f* *arco.* *mf* *p*

Vln. 2 *p* *pizz.* *ff* *p* *arco.* *p* *pp*

Vla. *mp* *mf* *pizz.* *mf* *arco.*

Vc. *f* *ff* *mf* *p*

Db. *p* *mp* *arco.* *mf* *mp* *f* *pizz.*

Detailed description: This page of a musical score contains measures 19 through 24. It features ten staves for various instruments: Flute (Fl.), Clarinet (Cl.), Bassoon (Bsn.), Horn (Hn.), Trombone (Tbn.), Violin 1 (Vln. 1), Violin 2 (Vln. 2), Viola (Vla.), Violoncello (Vc.), and Double Bass (Db.). The Flute part begins with a *pp* dynamic and includes a trill in measure 19. The Clarinet and Bassoon parts have dynamics ranging from *mf* to *p*. The Horn and Trombone parts feature dynamics from *p* to *f*. The Violin 1 part starts with a *pizz.* (pizzicato) instruction and a *f* dynamic, then switches to *arco.* (arco) in measure 20. The Violin 2 part has a *p* dynamic and includes a *tr* (trill) in measure 19. The Viola part starts with a *mp* dynamic and includes a *pizz.* instruction in measure 20. The Violoncello part has dynamics from *f* to *ff*. The Double Bass part starts with a *p* dynamic and includes an *arco.* instruction in measure 20. The score includes various musical notations such as slurs, ties, and dynamic markings.

X-Ray

1 $\text{♩} = 70$

Musical score for measures 1-9. The score is in 4/4 time with a tempo of quarter note = 70. It features five staves: Violin 1 (Vln. 1), Violin 2 (Vln. 2), Viola (Vla.), Violoncello (Vc.), and Double Bass (Db.).

- Vln. 1:** Starts with a *p* dynamic, moves to *pp*, then *mf* with a *pizz.* marking. It then plays *mp* with *arco.*, followed by *p*, *f*, and *ff*.
- Vln. 2:** Starts with *p*, then *ff* with *pizz.*, followed by *p*, *pp*, *mf*, *mp*, *f*, *mf*, and *p*.
- Vla.:** Starts with *p*, then *p*, *mp*, *p*, and *pp*.
- Vc.:** Starts with *f*, then *p*.
- Db.:** Starts with *mp*, then *mp*, *p*, *mp*, and *mf*.

10

Musical score for measures 10-14. The score continues with the same five staves as above.

- Vln. 1:** Starts with *p*, then *mp*, *mf*, *mp*, and *p*.
- Vln. 2:** Starts with *mp*, then *p*, *mp*, *f*, *mp*, and *p*.
- Vla.:** Starts with *p*, then *p*, *pp*, *mp*, *f*, *p*, *f*, and *pp*.
- Vc.:** Starts with *f*, then *f*, *mf*, and *p*.
- Db.:** Starts with *mp*, then *p*, *f*, *pp*, *mf*, and *mp*.

Musical score for measures 20-24. The score is for five instruments: Violin 1 (Vln. 1), Violin 2 (Vln. 2), Viola (Vla.), Violoncello (Vc.), and Double Bass (Db.).

- Measure 20:** Vln. 1 starts with *mf*. Vln. 2 is silent. Vla. is silent. Vc. has a half note. Db. has a half note.
- Measure 21:** Vln. 1 continues. Vln. 2 is silent. Vla. has a half note with *mf*. Vc. has a half note. Db. has a half note.
- Measure 22:** Vln. 1 continues. Vln. 2 is silent. Vla. has a half note. Vc. has a half note. Db. has a half note.
- Measure 23:** Vln. 1 continues. Vln. 2 is silent. Vla. has a half note. Vc. has a half note. Db. has a half note.
- Measure 24:** Vln. 1 has *f* and *pizz.*. Vln. 2 has *pizz.*. Vla. is silent. Vc. has a half note with *mp*. Db. has a half note with *p* and *f*.

Musical score for measures 25-29. The score is for five instruments: Violin 1 (Vln. 1), Violin 2 (Vln. 2), Viola (Vla.), Violoncello (Vc.), and Double Bass (Db.).

- Measure 25:** Vln. 1 has *pp*. Vln. 2 is silent. Vla. has a half note with *pizz.*. Vc. is silent. Db. has a half note with *mp*.
- Measure 26:** Vln. 1 continues. Vln. 2 is silent. Vla. has a half note with *arco.* and *mp*. Vc. is silent. Db. has a half note with *f*.
- Measure 27:** Vln. 1 continues. Vln. 2 has *arco.* and *mf*. Vla. has a half note with *mf*. Vc. has a half note with *pizz.* and *mf*. Db. has a half note with *f*.
- Measure 28:** Vln. 1 continues. Vln. 2 has *pizz.* and *mp*. Vla. has a half note with *pp*. Vc. has a half note with *f*. Db. has a half note with *f*.
- Measure 29:** Vln. 1 continues. Vln. 2 has *mp*. Vla. has a half note with *pp*. Vc. has a half note with *arco.* and *p*. Db. has a half note with *p*.

Gamma

1 ♩ = 70

Fl.

Cl. *f*

Bsn.

Hn.

Tbn.

Pno.

Vln. 1

Vln. 2 *f* arco.

Vla. *f* arco.

Vc.

Db.

8

Fl.

Cl.

Bsn.

Hn.

Tbn.

Pno.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

mf

15

Fl.

Cl.

Bsn.

Hn.

Tbn.

Pno.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

mp

pizz.

mp

pizz.

mf

Detailed description: This page of a musical score contains measures 15 through 21. The instrumentation includes Flute (Fl.), Clarinet (Cl.), Bassoon (Bsn.), Horn (Hn.), Trombone (Tbn.), Piano (Pno.), Violin 1 (Vln. 1), Violin 2 (Vln. 2), Viola (Vla.), Violoncello (Vc.), and Double Bass (Db.). The Flute part begins in measure 15 with a melodic line marked *mp*. The Clarinet and Bassoon parts provide accompaniment with rhythmic patterns. The Violin 2 and Viola parts have dense rhythmic textures. The Violoncello and Double Bass parts are mostly silent until measure 21, where the Double Bass has a short passage marked *mf* and *pizz.*. The Violin 1 part has a short passage in measure 21 marked *mp* and *pizz.*. The Horn and Trombone parts are silent throughout the page.

22

Fl.

Cl.

Bsn.

Hn.

Tbn.

Pno.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

pp

ff

Musical score for measures 40-45, featuring woodwinds, brass, strings, and double bass. The score is written in a key signature of one flat (B-flat major or D minor) and a common time signature. The instruments and their parts are as follows:

- Fl. (Flute):** Measures 40-41 feature a triplet of eighth notes. Dynamic: *mf*.
- Cl. (Clarinet):** Measures 40-41 feature a triplet of eighth notes. Dynamic: *mf*.
- Bsn. (Bassoon):** Measures 40-41 feature a triplet of eighth notes. Dynamic: *mf*.
- Hn. (Horn):** Measures 40-41 feature a whole note. Dynamic: *mf*. Measures 42-45 feature a melodic line with slurs.
- Tbn. (Trumpet):** Measures 40-41 feature a whole note. Dynamic: *mf*. Measures 42-45 feature a melodic line with slurs.
- Pno. (Piano):** Rests throughout the measures.
- Vln. 1 (Violin I):** Features a continuous sixteenth-note pattern with accents. Dynamic: *mf*.
- Vln. 2 (Violin II):** Features a continuous sixteenth-note pattern with accents. Dynamic: *mf*.
- Vla. (Viola):** Measures 40-41 feature a whole note. Dynamic: *mf*. Measures 42-45 feature a melodic line with slurs.
- Vc. (Violoncello):** Measures 40-41 feature a whole note. Dynamic: *mp*. Measures 42-45 feature a melodic line with slurs.
- Db. (Double Bass):** Features a continuous eighth-note pattern with triplets. Dynamic: *mf*.

47

Fl.

Cl.

Bsn.

Hn.

Tbn.

Pno.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

f

mf

pp

mf

Detailed description: This page of a musical score covers measures 47 through 52. The instrumentation includes Flute (Fl.), Clarinet (Cl.), Bassoon (Bsn.), Horn (Hn.), Trombone (Tbn.), Piano (Pno.), Violin 1 (Vln. 1), Violin 2 (Vln. 2), Viola (Vla.), Violoncello (Vc.), and Double Bass (Db.).
- Measures 47-50: Horn and Trombone play a melodic line. Horn starts with a forte (*f*) dynamic, while Trombone starts with a mezzo-forte (*mf*) dynamic. Both instruments gradually decrease in volume to a pianissimo (*pp*) dynamic by measure 50.
- Measure 51: The Horn and Trombone parts are silent.
- Measure 52: The Double Bass (Db.) part features a series of triplets, starting with a mezzo-forte (*mf*) dynamic.
- The Flute, Clarinet, Bassoon, and Piano parts are silent throughout the entire passage.

70

Fl. *mf* *mp*³ 3 3

Cl.

Bsn. *f*

Hn. *mp* *pp*

Tbn. *mp* *pp*

Pno.

Vln. 1 *f*

Vln. 2

Vla. arco. *f*

Vc.

Db. *ff*

Detailed description: This page of a musical score covers measures 70 through 77. The instrumentation includes Flute (Fl.), Clarinet (Cl.), Bassoon (Bsn.), Horn (Hn.), Trombone (Tbn.), Piano (Pno.), Violin 1 (Vln. 1), Violin 2 (Vln. 2), Viola (Vla.), Violoncello (Vc.), and Double Bass (Db.).
- Flute: Measures 70-71 have a rest. Measures 72-77 feature a melodic line with triplets, starting at *mp*.
- Clarinet: Plays a rhythmic eighth-note pattern throughout.
- Bassoon: Plays a rhythmic eighth-note pattern, starting at *f* in measure 70.
- Horn and Trombone: Play a melodic line with a dynamic shift from *mp* to *pp* between measures 71 and 72.
- Piano: Remains silent.
- Violin 1: Plays a fast, rhythmic eighth-note accompaniment starting at *f* in measure 70.
- Violin 2: Remains silent.
- Viola: Enters in measure 75 with a rhythmic eighth-note accompaniment, marked *f* and *arco*.
- Violoncello and Double Bass: Remains silent.
- Double Bass: Plays a rhythmic eighth-note accompaniment starting at *ff* in measure 70.

78

Fl. *f*

Cl.

Bsn. *f*

Hn.

Tbn.

Pno. *f* *ff*

Vln. 1

Vln. 2

Vla.

Vc. *f* pizz.

Db.

Detailed description: This page of a musical score contains measures 78 through 84. The instrumentation includes Flute (Fl.), Clarinet (Cl.), Bassoon (Bsn.), Horn (Hn.), Trombone (Tbn.), Piano (Pno.), Violin 1 (Vln. 1), Violin 2 (Vln. 2), Viola (Vla.), Violoncello (Vc.), and Double Bass (Db.). The Flute part features a melodic line with triplets and slurs, starting at measure 78. The Clarinet and Bassoon parts have rhythmic accompaniment. The Piano part has a complex texture with triplets and slurs, marked with dynamics *f* and *ff*. The Violin 1 part has a steady eighth-note accompaniment. The Viola part has a rhythmic accompaniment. The Violoncello part has a melodic line with slurs and dynamics *f* and pizz. The Double Bass part has a rhythmic accompaniment. The Horn and Trombone parts are silent throughout the page.

85

Fl. *f*

Cl. *f*

Bsn.

Hn. *mf*

Tbn. *mf*

Pno. *mf* *ff* *8va* *3* *ff*

Vln. 1

Vln. 2

Vla.

Vc.

Db.

92

Fl.

Cl.

Bsn.

Hn.

Tbn.

Pno.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

Detailed description: This page of a musical score covers measures 92 to 95. The Flute (Fl.) part features a rhythmic melody of eighth notes with slurs and accents. The Clarinet (Cl.) part has a similar eighth-note pattern with slurs and accents. The Bassoon (Bsn.) part is mostly silent. The Horn (Hn.) and Trombone (Tbn.) parts play sustained notes with slurs. The Piano (Pno.) part has a complex texture with sixteenth-note runs in the right hand and chords in the left hand. The Violin 1 (Vln. 1) and Violin 2 (Vln. 2) parts are silent. The Viola (Vla.) part has a rhythmic eighth-note pattern with slurs and accents. The Violoncello (Vc.) part has a rhythmic eighth-note pattern with slurs and accents. The Double Bass (Db.) part has a rhythmic eighth-note pattern with slurs and accents.

96

Fl.

Cl.

Bsn.

Hn.

Tbn.

Pno.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

p

p