Electroacoustics, optics, and microtonal aesthetics in the music of Georg Friedrich Haas

Amy Bauer, Landon Morrison

Introduction

The music of Austrian composer Georg Friedrich Haas (b. 1953) is often aligned with the spectralist school of composition, although the composer resists descriptions of his approach that characterize it in terms of any one technical attribute. Haas stresses that his pitch techniques—which include the juxtaposition of equal-tempered, justly-intoned, and aleatoric structures—are driven primarily by an expressive end. Thus, while he uses spectral harmony, he "protest against being called a spectralist,"[1] and while his music is filled with microtonal elements, he is "not really comfortable with being pigeonholed as a microtonalist composer," instead describing himself as a composer who is "free to use whatever means I need for my music."[2] This outsider positioning reflects the fact that, compared with Gérard Grisey and other founding members of l'Itinéraire, Haas works within a creative milieu that long ago permitted composers to engage in pluralistic practices. So, while sharing with first-wave spectralists an aesthetic appreciation for dynamic sounds that, "like living things ... unfold in space and time,"[3] he does not stay within the bounds of any single approach, rather choosing to construct a heterogeneous microtonal aesthetic that cuts across conventional boundaries of genre and style.

Haas's prodigious and varied output since the eighties includes concerti, operas, homages and several dozen chamber works, all of which treat instrumental sound color and texture as a central element of musical discourse. The expressive force of pitch and timbral effects in his music has long been bound to a theatrical play with light and shadow that creates an immersive, multisensory experience for listeners. In more recent works, this expressive palette has been further extended through a use of electroacoustic technologies to implement tape-delay and additive synthesis models during live performance. We attend here to both of these neglected aspects of Haas's oeuvre. First, through a detailed analysis of excerpts from three mixed works—

---

[1] Georg Friedrich Haas, "Mikrotonalität und spektrale Musik seit 1980," in Jörn Peter Hiekel (ed.), *Orientierungen: Wege im Pluralismus der Gegenwartsmusik*, (Mainz, Schott, 2007), 128.

[2] András Bálint Varga, "Interview with Georg Friedrich Haas," in *Three Questions for Sixty-Five Composers* (University of Rochester Press, 2011), 102.

[3] Georg Friedrich Haas, "Anmerkungen zum Komponieren," Musik und Metaphysik, ed. Eckhard Tramsen, (Hofheim: Wolke, 2004), 115.

String Quartet No. 4 (2003), *Ein Schattenspiel* (2004) for solo piano, and the large ensemble piece ... *und* ... (2008-09)[4]—which serve to demonstrate some of Haas's characteristic microtonal devices and show how they are extended through a use of electroacoustic tools that operate on both technical and hermeneutic registers. Next, through an expanded analytical treatment of light as a metaphoric and literal aspect of composition in the large-scale orchestral pieces *in vain* (2000) and *Hyperion* (2006).[5] By showing how electroacoustic and optical techniques play an increasingly central role in Haas's compositional method, our work adds a new perspective to existing accounts of his music, which have focused almost exclusively on the dimension of pitch.[6] But to fully appreciate the significance of these novel techniques, it is still necessary to understand some historical and theoretical background for the composer's rather eclectic microtonal aesthetics. We start, then, with an examination of his diverse influences, focusing in particular on his stylistic connection to the Russian composer Ivan Wyschnegradksy (1893-1979), whose *loi de la pansonorité* is foundational in Haas's music. This connection is further pursued through a close reading of Haas's own published comments on composing with microtones, and again at the end of the chapter, where we consider the enjoinment of pansonic and panoptical spaces as a framework for making sense of his multisensory and multimedia compositions. We conclude by considering the "microtonal ethics" of Haas's approach with reference to critical reception of his work, and with a brief consideration of his most recent venture into cultural politics in the work *I can't breathe* for solo trumpet in memoriam Eric Garner (2015). As our analyses demonstrate, the breadth of Haas's later music is a natural outgrowth of long held concerns, articulated in a series of statements over the last thirty years, and his early explorations with microtones and harmonic spectra are inseparable from his aesthetics, which place a priority on listening while recognizing the artifice and necessary abstraction inherent in any compositional approach.

---

[4] Aside from these three pieces, Haas also uses electronics in String Quartet No.7 (2011) and *Les temps tiraillés* (2008) for two violas, and bassoon.

[5] Other light-centric chamber works include String Quartet No. 3 "In iij Noct." (2001), *Sayaka* (2006), *Ins Licht* (2007), and *Solstice* (2019), while operas include *Die schöne Wunde* (2003), *Bluthaus* (2010–11) *Thomas* (2013), and *Morgen und Abend* (2015).

[6] Pitch-based structures in Haas's music have been theorized by a number of scholars, such as Robert Hasegawa (2015), who describes "clashing harmonic systems" in Blumenstuck and in vain, and a number of others, including Farthofer (2007), Heilgendorff (2017), Silva (2018), and Morrison (2019).

Historical influence on Haas's microtonal aesthetics

Early in his career, Haas was exposed to the work of microtonal composers and tuning systems outside the traditional twelve-tone equal-tempered (12TET) subdivisions of western music. He performed works by Ivan Wyschnegradsky, Alois Haba, James Tenney, Harry Partch and Julian Carrillo with friends and colleagues at the University in Graz. Although attracted to the formal procedures of Haba and the tuning experiments of Tenney and Partch, Haas was most directly influenced by three of Wyschnegradsky's key concepts: a pansonorous "sound continuum," "ultrachromaticism," and non-octave pitch cycles.[7] The first of these was introduced in Wyschnegradsky's *La loi de la pansonorité* to denote "an infinite number of musical tones arranged at infinitely small distances," and it forms a purely hypothetical backdrop to the scales with which composers work.[8] The second concept refers to the ultrachromatic division of this total sound continuum into different equal-tempered divisions of the octave, from 24 to 144 notes per octave. And finally, "non-octaviant" frequency spaces are those that substitute a contracted or expanded near-octave interval for the traditional octave equivalence framework.[9]

In a structural analogy with the diatonic system, Wyschnegradsky employed these spaces as interval cycles to generate scale collections of different sizes and transposition limits. His preferred semitonal intervals—the major seventh and minor ninth—theoretically unfold over 11 and 13 octaves respectively: beyond the audible range (or at least the span of a piano keyboard). These cycles, of course, generate the twelve-note scale of the total chromatic. But if by analogy we use 11 and 13 to refer to quarter tones (i.e., 5.5 and 6.5 semitones, respectively), we traverse a complete twenty-four-tone (24-TET) system. As shown in **Figure 1**, this cycle can also be thought of as two independent cycles of 11 semitones interlocked at the distance of 11 quartertones. The internal structure of this 11-semitone periodic unit may then be subdivided by perfect (equidistant) or imperfect (non-equidistant) intervals. Thus, while in semitonal space, a major seventh may be divided imperfectly into a tritone and perfect fourth, in quartertonal space, it may be perfectly bisected evenly by 11 quartertones, producing the interval pair

---

[7] As elaborated in Ivan Wyschnegradsky, "Ultrachromatisme et espaces non octaviants," *La Revue Musicale* 290–91 (1972), 71–141.

[8] Ivan Wyschnegradsky, *La loi de la pansonorité* (Geneva: Éditions Contrechamps, 1996).

[9] See the example labeled *Structures de base de volume et de densité diverse* in Wyschnegradsky 1972, 73–138. Contracted octaves are listed on top, with expanded octaves on the bottom of the chart.

Wyschnegradsky labeled major fourth (see Fig. 1).

[**Figure 1,** 11-cycle in semitonal and quarter-tone space (upper staff) and the tritone/perfect fourth vs. major fourth division of the near-octave major 7th space (lower staff).]

quartertone 11-cycle from C0 as two interlocking semitone cycles

Imperfect binary chord divisions consisting of 6 and 5 semitone intervals, bounded by a major 7th

Perfect binary chord division consisting of two 11 quartertone intervals, bounded by a major 7th

Haas readily professes his long-standing preference for "Wyschnegradsky chords,"[10] especially those with an imperfect binary division of perfect fourth and tritone, as depicted in Figure 1. Moreover, Haas has identified Wyschnegradsky as a key historical influence in his writings on microtonal traditions and in two extended essays on the composer's music.[11] But these well-documented associations obscure some key differences between the two composers. Perhaps most importantly, while Wyschnegradsky's method for actualizing pitch space was strictly guided by the regular division of a continuum, Haas seems happy to combine equal-

---

[10] Haas, "Mikrotonalität und spektrale Musik seit 1980" (2007, 129).

[11] Haas, "Die Verwirklichung einer Utopie: Ultrachromatik und nichtoktavierende Tonräume in Ivan Wyschnegradksys mikrotonalen Kompositionen," in *Harmonik im 20. Jahrhundert* (Vienna, wuv-Universit.tsverlag, 1993a), 87–100; and "Arc-en-ciel, Op. 3, Ivan Wyschnegradskys behutsame Annäherung an des Zwölfteltoninterval," in *Mikrotöne IV* (Munich, 1993b), 79–92. The first essay offers an overview of ultrachromaticism and non-octaviating spaces, while the second offers a harmonic analysis of Wyschnegradsky's *Arc-en-ciel*, Op. 37 (1956) for six pianos tuned a twelfth-tone apart.

tempered divisions of all sizes with overtone chords and aleatoric pitch content. This characteristic eclecticism signals a reflexive awareness that none of these systems is universal or inevitable, despite having attained a naturalized status in certain aesthetic discourses. Haas evinces this reflexivity when he declares "the harmonic series is an artifact" in the first of his five theses on microtonal music.[12] By this is meant that, despite their foundational standing in microtonal harmony, the terms "harmonic series" and "pure tuning" are loaded with ideology and represent a compositional model as abstract as any serial procedure. We note here that actual instrumental sounds are always slightly changing, their higher partials shifting as the physical mass of their sound source and surroundings shifts. Hence, the paradoxical phenomenon that sounds which most clearly manifest the "harmonic series" are static: for Haas, these include old refrigerators, electrical substations, and other machines. Haas declares that "any attempt to precisely grasp this overtone series is doomed to failure." Yet it is this very striving after an impossible ideal that seems to characterize Haas' compositional process, and his aesthetics as a whole.

Haas's remaining theses are equally illuminating for detailing his approach to microtonal aesthetics. Thesis 2—the basic human need for beats in music—serves as a further illustration of the difference between abstract models and the messiness of actual sounds, as it emphasizes how augmented or diminished octaves, "slightly detuned" unisons and other examples of "friction, not fusion" proliferate across diverse musical cultures. Indeed, Haas suspects that the near universal success of the twelve-tone tempered harmonic system may be a direct result of its "false" but beat-rich major and dominant seventh chords. Just as we have abstracted the notion of a harmonic series, so we have abstracted the notion of pitch in space. From this follows the third thesis, that equivalence between pitch classes can no longer be assumed, as it has been in a great deal of tonal and post-tonal theory. From pitch-class names, to inversions, and voicings, we often treat the registral placement of pitch as incidental, when in fact, each partial tone is bound to an octave position, as well as to a neighborhood of intervals around it.

The final two theses directly concern the composition, performance and perception of explicitly microtonal music. In the fourth, Haas cautions that Western staff notation clouds the intervallic and harmonic relationships of microtonal music, while in the fifth, he identifies an

---

[12] Georg Friedrich Haas, "Fünf Thesen zur Mikrotonalität," P*ositionen: Beiträge zur Neuen Musik* 48 (2001), 42–9; reprinted in Farthofer, *Georg Friedrich Haas*, 122–27.

even greater challenge in the perceptual difficulties of working with small intervals. Regarding the latter, he observes that, the smaller the interval difference, the more time it takes the human perceptual apparatus to distinguish it. Rapid movements within microtonal systems will simply neutralize pitch differences, as both performers and listeners need time to hear out slow beats and the upper proportions of the partial series. Microtonal music thus needs more space, more time, and more opportunities for development.

Haas frames his concerns with tuning, harmonic generation, and perception in more technical terms when he categorizes microtonal composition into four generalized approaches: 1. tempered subdivisions of the octave, 2. orientations around the proportions of the overtone series, 3. sound-splitting techniques (Klangspaltung) that produce beating effects between near-unison pitches, and 4. aleatoric approaches that yield unpredictable pitch content.[13] To illustrate these categories, he has identified a list of over forty-four representative composers, ranging from Perotin to Lachenmann, who are encompassed by what he imagines as a plentiful patchwork of microtonal traditions. The aesthetic effect of this discursive maneuver is to create a relational space where historically situated idioms enter into contact with one another. Indeed, Haas has been known to quote explicitly from outside sources, grafting old musical texts into new settings.[14] But more commonly, the origins of his material are obscured through an abstraction of sonic tokens that allows him to engage with the past on a more subtle and refined level. These engagements, and their musical effects, are uniquely illustrated in Haas's electroacoustic chamber works, which use tape and synthesis models to stage interactions between an array of microtonal spaces. With this in mind, the analyses that follow begin with the composer's use of technology to create harmonic structures in these smaller works, establishing a sonic basis on which to then consider his use of light in the larger orchestral context.

---

[13] These four approaches to microtonality are first outlined in Haas's 1999 essay "Jenseit der Zwölf Halbtöne," but they are expounded in fuller detail in his 2003 article, "Mikrotonalitäten." They resurface in slightly expanded form in his 2007 article titled "Mikrotonalität und spektrale Musik seit 1980"; in this final incarnation, Haas expands the first category to cover all types of "scales," further dividing this new heading into subcategories such as non-European scales, equal divisions of the octave, and irregularly structured scales.

[14] For instance, Haas quotes unfinished fragments of Mozart's Requiem (K. 626) in his choral work Sieben Klangräume (2005) and uses Schubert's unfinished Piano Sonata in C (D. 840) as the basis for his orchestral work Torso (2001).

Composing with electroacoustic tools and techniques

Although Haas is not well-known as a composer of electronic music, a number of his recent works incorporate sound technologies and mixed media as core elements, signaling a growing interest in the genre over the past two decades. Haas's first pieces of mixed music, String Quartet No. 4 (2003) and *Ein Schattenspiel* (2004) for solo piano, share a similar use of live electronics to record instruments and playback the unprocessed audio at different speeds. Mimicking the effects of a familiar tape-delay technique known as the *reinjection loop*, this simple configuration hitches tempo to pitch, allowing for the manipulation of interactive temporal processes between performer(s) and electronics, as well as the juxtaposition of multiple tuning systems. As shown in **Figure 2**, one finds in *Ein Schattenspiel* a situation where everything played by the pianist is recorded, delayed by twenty-seven seconds, and then reinjected at a fixed and slightly accelerated ratio of 33/32 as compared to the original. The result is a continuous process of temporal contraction in the lag time between performer and their musical "shadow," along with an upwards quartertone transposition that establishes a composite 24-tone equal-temperament system recalling the microtonal piano works of Wyschnegradsky.

[**Figure 2.** Form diagram for *Ein Schattenspiel*, showing piano recorded into single audio buffer (solid line) and played back at faster speed (dashed line).]
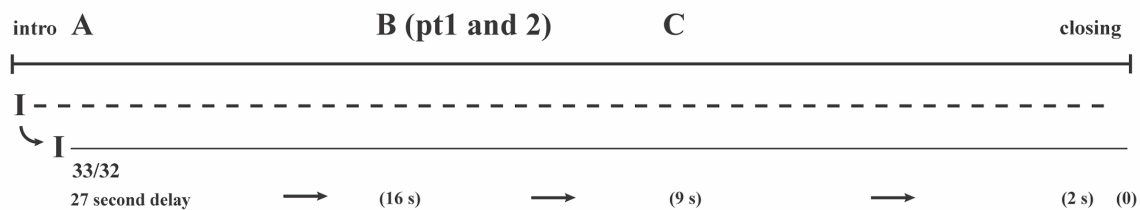
The harmonic effects of the quartertone tuning system in Ein *Schattenspiel* can be heard in Haas's unambiguous citations of the "Wyschnegradsky Chords" identified above, which appear as perfect and imperfect binary divisions of non-octave spaces.[15] In the passage shown in

---

[15] Haas mentions "Wyschnegradksy Chords" specifically in connection with *Ein Schattenspiel* in his 2007 essay (129): "Wyschnegradsky chords appear here in their quartertone version, in addition to the quartertone harmonic concepts of the late Romantic Richard Heinrich Stein. And I recall in my compositions my own past as a pianist of quartertone music. This is not spectral music."

Figure 3, which marks the beginning of Section B, these iconic chords take the form of stacked major sevenths (*octaves contractée*), as indicated in the piano's first harmonic module containing pitches A – Gs – G and Fs. The interactive principle governing the passage dictates that, whenever the live electronics catch up to the module currently being played on piano, the performer moves ahead to the next collection of pitches. Furthermore, with each successive module another pitch is appended, initiating an additive process that eventually runs through to its inevitable conclusion—an aggregate of all twenty-four pitches within the quartertone system.

[**Figure 3.** *Ein Schattenspiel*, Section B, part 1 (p. 6-7), score excerpt of "Wyschnegradksy Chords" formed by interlocking of piano and live electronics.]

The process of 24-tone pitch aggregation described above can be more easily grasped in **Figure 4**, which tracks voice-leading between harmonic modules through the first half of Section B. Notice how, at each new stage, pitches that were previously played by the performer shift upwards by quartertone in the live electronics, while at the same time, the performer moves downward in a sequence of perfect fourths. Thus, the two parts interlock to form perfect binary divisions of near-octave major seventh spaces, yielding dense chordal stacks built entirely from eleven quartertone interval cycles. Thanks to the additive pitch process, the register also expands in both directions simultaneously so that, as each harmony planes downward, transient threads of ultrachromatic voice-leading drift upwards, projecting a bi-rotational orientation to the overall

sequence. Arriving at the last two modules in the section, the piano's eighty-eight key range has been exhausted and the quartertone pitch space fully saturated, prompting a dramatic moment where Haas loops around from the extreme high to the extreme low end of the piano's register in order to complete the interval cycle. Finally, an unexpected tritone descent at the end of the sequence breaks this pattern, causing the piano and live electronics to re-align as a dual interval cycle alternating between thirteen and nine quartertones.

[**Figure 4.** Voice-leading diagram of Section B, part 1 (p. 6-8).]
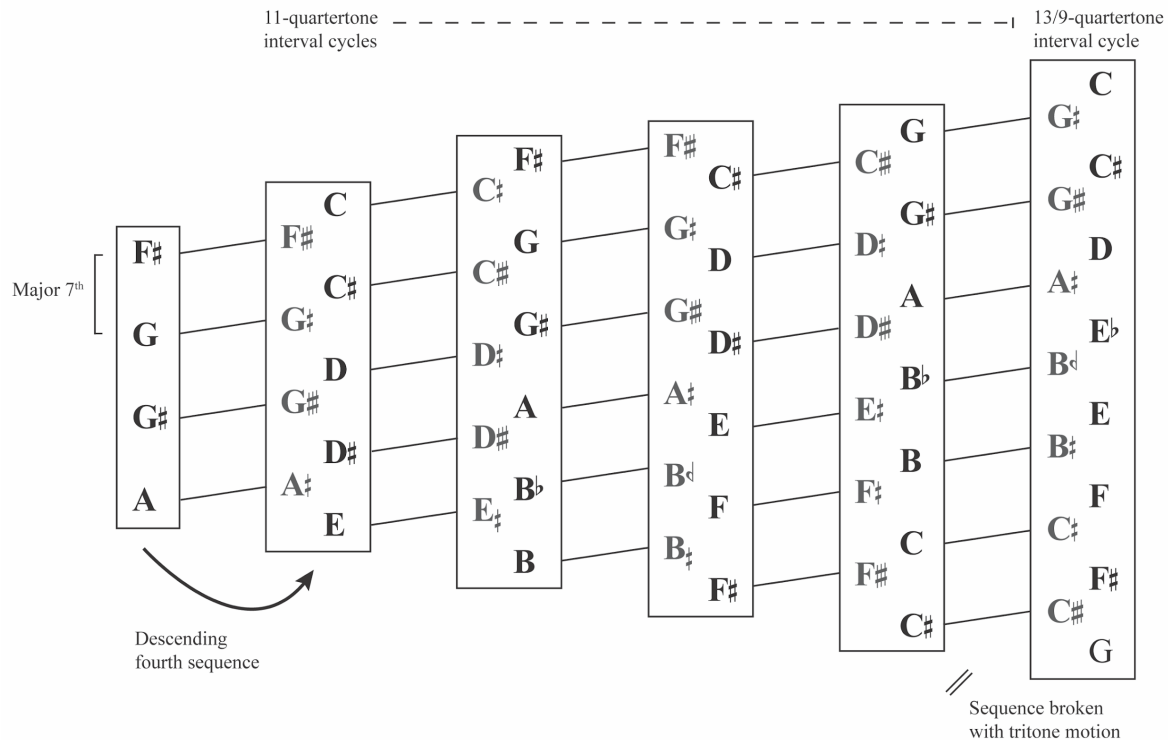
Haas uses "Wyschnegradsky Chords" less often in his String Quartet No. 4, which instead features a diverse range of harmonic spaces, taking advantage of the more flexible tuning in string instruments and a more adventurous adoption of multiple playback speeds. Compared to *Ein Schattenspiel*, the quartet exhibits a complex formal design, consisting of three sections that return in a loose, rondo-like rotation, as shown in **Figure 5**. Mirroring this formal complexity, Haas's use of the reinjection loop in the quartet also follows a more sophisticated scheme. Instead of a single audio buffer, there are five separate buffers, designated in the form diagram by roman numerals. The audio stored in each of these buffers is reinjected in a stop-and-go

fashion, allowing for the construction of a flexible musical form with many moving parts. In addition, recorded audio is reinjected at several playback speeds, producing a wide variety of time-pitch transpositions. Through the juxtaposition of transposed recordings and new material played by the performers, Haas sets up some truly striking confrontations between different harmonic systems. In this way, his use of the reinjection loop represents more than just an effective means for structuring musical relationships; it acts as a hermeneutic device, which is used to reinject traces of historical influence and capture something of the aesthetic pluralism that underpins so much of his music.

[**Figure 5.** Form diagram from String Quartet No. 4, showing quartet recorded to multiple audio buffers (solid lines, I-V) and reinjected at multiple tempos (dashed lines, ratios of playback speed indicated as fraction)].
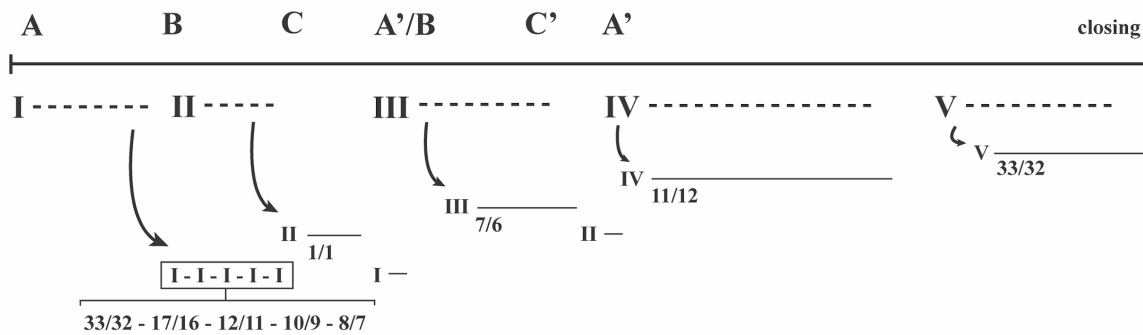
To offer just one example of how this more flexible reinjection loop operates in the quartet, **Figure 6a** captures the work's initial shift from just intoned harmony to equal-temperament at the end of Section A. Supported by a reinjected C_3 fundamental in the live electronics (I), the strings settle into an overtone chord articulating partials 3, 7, 11, and 21. After the harmony congeals, the strings slide from their upper partials to new positions within a stack of alternating major sevenths and minor sixths (i.e., a dual 11/8-semitone interval cycle), thus precipitating motion from a single harmonic system to a bi-polar pitch space where just-intoned (live electronics) and equal-tempered (quartet) harmony intermingle. Finally, as the performers maintain their respective pitch content at the beginning of Section B, the live electronics intermittently reinject the overtone sonority using multiple playback speeds. Widening temporal

ratios of 1/1, 33/32, 17/16, 12/11, 10/9, and 8/7 produce a corresponding quartertone scalar ascent, as depicted in **Figure 6b**. Heard in relation to the composite texture, it is possible to detect three distinct harmonic strains being braided together in this section—the dual-interval cycle played by the quartet, the overtone chords sounded by the live electronics, and the subsequent quartertone transpositions of these overtone chords.

[**Figure 6a and 6b.** (a) String Quartet No. 4, end of Section A (p. 2), showing overtone chord in strings moving to equal-temperament dual 11/8-semitone interval cycle, with live electronics reinjecting a sustained C overtone sonority; (b) beginning of Section B (p. 3), ascending quartertone transpositions of C overtone chord via reinjection at different speeds.]
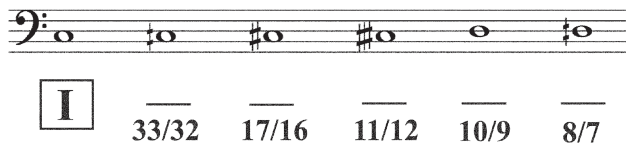
6a

6b

I   33/32   17/16   11/12   10/9   8/7

After these early mixed works, Haas makes a definitive turn in his still-nascent corpus of electronic music with the colossal hour-plus *Les temps tiraillés* (2008)[1] for two violas, bassoon, and electronics (with optional choreography) and the chamber work *... und ...* (2008–09) for large ensemble with electronics. Both pieces move away from a tape music paradigm into the sound world of additive synthesis, where he engages the technocultural origins of spectral harmony. With this shift in media practices, one hears a corresponding move towards greater precision and flexibility in the kinds of harmonic structures that can be generated, with synthetic spectra acting as an external referent for what becomes a complex "tuning" process between the performers, instruments, and electronics. A remarkable example of this appears in *Les temps tiraillés*, where performers are interwoven with synthesized sounds to simulate an auditory illusion known as the Shepard tone, in which the registral layering of glissandi in multiple voices creates a sense of never-ending motion. Another example can be found near the end of *... und ...* (see **Figure 7**), at a point where the ensemble interacts with the electronics in a way that mimics an impulse-resonance model, with swelling *fortissimo* impulses in the electronics followed by the resonant effects of orchestral instruments. In m. 213 of the score excerpt below, a spectrum built on B-flat in Electronics I is superimposed onto the existing G-quarter-flat spectrum in Electronics II. Until m. 217, that is, when a new spectrum on A-sixth-flat emerges. For each new spectrum introduced in the electronics, higher partials are numbered in the score, as is their subsequent distribution among instruments in the ensemble (e.g., B-flat partials assigned to 1Kl., 1 Akk., 1vln and 3 vln, 1 vla, 1 vc, 1 kb.)

[**Figure 7.** *... und ...* (2008-09), mm. 213-220, start of long-range progression of overlapping overtone chords in two separate electronics parts (labeled I and II in score).]

Grundtöne im Verhältnis 9:11
(imaginärer Basiston: vierteltönig erniedrigtes Subkontra-F)
Die Klänge 2 und 4 können auf Zeichen des Dirigenten/der Dirigentin mehrmals
gespielt werden, um die Obertonakkorde bewusst zu machen (Dynamik variieren!)
cca. 60 sec.

Grundtöne im Verhältnis 10:11
(imaginärer Basiston: vierteltönig erniedrigtes Subkontra-F)
Die Klänge 4 und 6 können auf Zeichen des Dirigenten/der Dirigentin mehrmals
gespielt werden, um die Obertonakkorde bewusst zu machen (Dynamik variieren!)
cca. 60 sec.

③ (Exposition des Klanges der Gruppe 1)   ④ (Erinnerung an den Grundakkord)
⑤ (Umschichtung des Klanges der Gruppe 1, Exposition des Klanges der Gruppe 2)   ⑥ (Erinnerung an den Grundakkord der Gruppe 1)

213

Elektr.

Afl.

1. Kl. (B)

2. Kl. (B)

Hn. (F)

1. Pos.

2. Pos.

Akk.

1. Vl.

2. Vl.

3. Vl.

1. Vla.

2. Vla.

1. Vc.

2. Vc.

1. Kb.

2. Kb.

poco cresc./decresc. ad lib.

innerhalb des selben Obertonakkordes neuen Partialton suchen
sim. (ohne gemeinsame Dynamik mit 1.Kb.)
sim. (ohne gemeinsame Dynamik mit 2.Kb.)
senza sordino
(siehe Anmerkung unten)
(PAUSE)

Die InstrumentalistInnen versuchen, immer wieder gemeinsame Crecsendi/Decrescendi mit anderen Ensemblemitgliedern zu realisieren:
Entweder: gemeinsam innerhalb der 1. bzw. 2. Gruppe (es müssen nicht alle dieser Instrumente beteiligt sein) = spektraler Akkord
Oder: 1. Kl. gemeinsam mit 2. Kl. bzw. 1. Vl. gemeinsam mit 2.Vl. usw. (= Schwebungen)

1.Kl., 1.Vl., 1.Va., 1.Vc., 1.Kb.:
frei einsetzen, Tonhöhe von Monitor übernehmen
freie Crescendi/Decrescendi zwischen *pp* und *mf*,
kurze Pausen, Dauer der Töne zwischen 3 und 7 Sekunden

Looking closer, the progression of fundamentals in this section of the work (mm. 210-244) unfolds a selection of ascending partials from a harmonic series grounded on a "virtual fundamental" of F-quarter-flat;[16] as shown in **Figure 8**, when taken as a whole, the fundamentals form a collection of harmonics 9, 10, 11, 14, 16, 24, 26, 28, and 30. However, because the implied fundamental is never voiced, and because these "harmonics" are themselves acting as fundamentals generating their own spectra, and furthermore because they occur in succession rather than simultaneously, there is no chance a listener might hear the virtual fundamental that underlies the progression. Instead, the reference sonority acts at a distance on the series of overtone sonorities as they proceed along two separate streams (Electronic parts I and II, with ensemble split into two mirroring groups). The result is leap-frogging pairs of overlapping spectra, voiced so that multiple versions of the same equal-tempered pitches sound together, producing beating effects that result from the aforementioned Scelsian sound-splitting technique, *Klangspaltung*.

[**Figure 8.** *... und ...* (2008-09), Reduced version of progression in mm. 210-244, with overlapping fundamentals between Electronics parts I and II.]

---

[16] The "virtual fundamental" here refers to a perceptual phenomenon where listeners perceive a low fundamental, despite its being absent, if presented with a collection of pitches that maps onto higher partials in the overtone series above that fundamental.

mm. 210 - 244

harmonics over low-F♯ "virtual fundamental"

Harmonics selected for progression

= Virtual Fundamental

In his most recent mixed work, String Quartet No.7 (2011), Haas explores textures saturated with granular synthesis, a process that allows for discombobulating digital audio into distributed clouds of microsonic particles. The granulated stringed instruments in this piece are mirrored by trills in the live quartet, forging a timbral elision around a shimmering sonority that belongs in the realm of special audio effects. The piece appears to be an outlier in Haas's oeuvre, venturing into terrain that has no easy parallel in his other music. Perhaps it signals the beginning of an emergent stylistic trajectory that has yet to be fully explored, but even as an isolated instance, the use of digital effects in the quartet suggest the continuation of a pattern, where Haas has steadily progressed through a series of controlled case studies on how to compose with historically situated technologies and techniques. First, with tape-delay techniques in his early live electronics works (*Ein Schattenspiel*, String Quartet No. 4), then with finely tuned additive synthesis models in pieces like *... und ...*, and finally, with the adoption of digital audio effects in the seventh quartet. As with his pluralistic pitch language, the variety of electroacoustic techniques on display in these works is indicative of Haas's eclectic approach to constructing

concrete yet heterogeneous spaces and systems out of a virtually limitless pansonorous continuum. As discussed in the next section, his large-scale opera and symphonic works explore these pluralistic harmonic and textural effects in the context of a live orchestra, often one not only augmented by but bound to orchestrated lighting effects. Building on the preceding analyses, we will now consider how Haas's use of lighting to create a multisensory and multimedia experience in live concerts adds an extra layer of mediation to the musical work concept and further supports the argument that technology has exerted an essential yet understated influence on his artistic development.

Light as metaphor and instrument in *Hyperion* and *in vain*

Haas began using light as a metaphorical feature of his theatrical compositions with the brief opera *Adolf Wölfli* in 1981. In the 1996 chamber opera *Night* the character of Hölderlin appears bathed in different colors to indicate his mental state and the fluctuation between reality and fiction. *Melancholia*, an opera about the poor Norwegian painter Lars Hertervig, uses light similarly to distinguish the artist's inner life from his cold reality. But working with light as a "musical instrument" has become a part of Haas' instrumental music as well, culminating with *Hyperion* in 2006, subtitled "Concerto for light and Orchestra." The artist rosalie designed a light sculpture for the work's premiere, but the published score allows some flexibility, as long as four orchestral groups—placed around the four walls of the performance space—are each faced by a different light source. According to Haas, a change in the color of light is intended to change one's perception of sounds, and the structure of light in time "acts like a silent drum."[17]

By way of contrast, it is the absence of light that changes both audience and performer's perception of sounds and space in *in vain*. In the best known of its two versions, concert lights on the rostrum and desk fade to full darkness at measure 70. The shift from light to darkness accompanies and intensifies metaphorical gradations of light in the harmonic language of the work: combinations of—and transitions between—vastly different harmonic collections, and strategic juxtapositions of tempered and non-tempered harmonies that generate auditory

---

[17] Georg Friedrich Haas, program notes for *Hyperion* (2007), trans. Peter Burt, https://www.universaledition.com/georg-friedrich-haas-278/works/hyperion-12730, accessed 30-6-21

illusions. Wyschnegradsky's notion of cycles feeds into certain pitch paradoxes that Haas favors, such as the Shepard scale effect that serves as the work's thematic backbone. Haas's chord voicings seem to reflect William Sethares's demonstrations on the relation between "sensory consonance and dissonance" and timbre and tuning; that is, tritone-based chords which sound consonant, and which function differently in an inharmonic musical universe.[18]

The opening of *in vain* features descending Wyschnegradsky tritone/fifth chords voiced as a whole-tone French augmented sixth chord, with interlocking tritones over C2 in the bass, in marimba, crotales, piano, accordion, strings and winds in a heterophonic, descending cascade. In m. 2 the upper voices are further subdivided to form an octatonic (1,2) collection—still symmetrical, but with gaps of a third in the lower voices. These descending collections shift to octatonic 0,1, and 2,3 in mm. 2-9, as a Shepard's tone effect gathers momentum: although the scales descend in pitch, they circle back to rise ever higher, with instrumental groups ebbing like waves **(Figure 9)**.[19] In m. 18 a sustained set class (0235) in woodwinds and strings, joined by a septachord in strings, announcing a new harmonic phase. Here, one whole-tone of the octatonic is subdivided in order to form non-octavian scales which descend from C#6 from m. 29.

[**Figure 9**, *in vain*, pitch reduction of mm. 1–7 and mm. 29–30.]

---

[18] See William A. Sethares, *Tuning, Timbre, Spectrum, Scale* (London: Springer, 2005), chapter 6, 97–130.

[19] Pitch-class (PC) sets and larger collections follow the conventions set out in Joseph N. Straus, *Introduction to Post-Tonal Theory*, 4th edn (New York: W.W. Norton, 2016). Distinct pitch collections are identified by a subscript denoting the first unique semitone in each collection when counting upwards from C (0), e.g. OCT0,1 denotes the octatonic collection that contains C and C#/Db (0134679T).

The light dramatically dims in measures 70-78, and the scale fragments wane in winds, glockenspiel, piano, and accordion, while, beginning in the bass, staggered lines rise in sustained ascents of semi- and sixth-tones. By measure 76 the auditorium is completely dark, and the harmonic cast shifts from tritone/fifth chords to those built on non-tempered partials (**Figure 10**). The harp enters at rehearsal E (9'17") with partials of B-flat, followed by the strings with partial chords related to B-flat2 and A2. Bar numbers resume in m. 77 along with a hesitant march back into light, accompanied by what is essentially an extremely-slowed down version of the initial descent, conducted as a progression of spectra based on virtual fundamentals. This progression proceeds by a hexatonic collection which—as did the octatonic scales in the opening—shifts collection at the major 7th to create a non-octaviant descending scale, as tempered tones slowly accrue to the partial harmonies.[20] During transition to a final dark phase, combinations of different overtone spectra emerge like sparks: for instance, in mm. 486–89, trombones play partials 6 and 7 of F#1, while horns play partials 5 and 6 of A1, to produce two C#4s a twelfth-tone apart and two E4s a 6th tone apart (see **Fig. 11**)

---

[20] These fundamentals transition from the collection $HEX_{1,2}$ to $HEX_{2,3}$ and $HEX_{3,4}$ (mm. 76–145), before settling in $OCT_{0,1}$ A reduction of this passage appears on p. 446 of Max Silva's. "Heard Utopia vs Utopian Hearing: Haas's *in vain* and Political Ambivalence in New Music," *Twentieth-Century Music* 15/1 (2018), 75–102.

[**Figure 10**, *in vain*, pitch reduction of mm. 76–78.]

[**Figure 11**, *in vain*, conflicting F#–A thirds in horn and trombone, m. 483–89.]

Haas advances the integration of light as a solo instrument with its own "voice"—and multiple functions—in *Hyperion*. In the work's program note, he wonders: what might "'counterpoint' mean between two such diametrically opposed media as music and light – conceived here not as co-existence, nor as doubling, but as an integral component of an artistic whole which transcends generic boundaries?"[21] As noted above, *Hyperion* sets four orchestral groups around the performance space, with a different light source in front of each ensemble; players see this source clearly, but the light director determines its form. The score prescribes light cues specified to the nearest millisecond, coordinated with sectional divisions in the sound stream, or used as a metronome in central passages of the work. Central to *Hyperion*'s conception is the concept that the changing colors, hues and shades of these lights will affect an audience's perception of the harmonies, especially during aleatoric passages. Hence the light sources do not function as a conductor, but as a pre-programmed "machine" traveling mutely alongside the musicians—an effect noted by Uwe Schweikert at the work's premiere with lighting provided by the artist rosalie.[22] The result is a kind of multimedia extension of

---

[21] Haas, program notes for *Hyperion*.

[22] Uwe Schweikert, "Es werde Licht. Uwe Schweikert, "Let there be light. Installationen von rosalie bei den Donaueschinger Musiktagen und bei «Norma» in Saarbrücken, *Opernwelt* 47/12 (2006), 24.

Wyschnegradsky's law of pansonority, where Haas's use of lighting effects reconstitute the virtual continuum to include both sound and light, hearing and seeing, within a conjoined pansonorous and panoptical space.

Also unlike *in vain*, *Hyperion* makes use of two pianos: one tuned to the partials of A0 and one to the partials of Eb1. The harmonic progression of the work is similar to *in vain* in that it exploits the opportunities for both harmonic fusion and dissonant friction offered by the simultaneous use of different tonal systems. *Hyperion* offers variations on the techniques discussed above. The work's twelve-tone cluster in piano and strings is formed from juxtaposed and interlocking Wyschnegradsky trichords in their equal-tempered, imperfect binary division (the union of two Wyschnegradsky chords inverted around their outer pitches). Whereas *in vain* began with falling scales, this twelve-tone chord launches a series of circular, rising scales and glissandi. The often free repetitions of this material, delimited only by temporal markers, incorporates quarter-tone passages, quarter-tone harmonics, and (briefly) the higher partials of a fundamental on G1.

These contrasting tonal systems, in combination with the constantly shifting relative temporal divisions within and between successive passages, create a highly-disorienting tonal vortex linked to the waning and waxing of the light voice. Until, that is, roughly a quarter of the way through *Hyperion*'s duration (mid-way through reh. **K**), where the rising scales stagger to a close, and the familiar descending motions from *in vain* return: arpeggiated thirds interspersed with diatonic and octatonic collections. This pitch organization is indicated by an abbreviated chart of formal events in Table 1 that also includes lighting effects, shifts in texture, and relative tempo.

Table 1, Formal events in *Hyperion*

Intro	A	K	O
(time)	30"	9'42"	12'

(light) **D**	Sudden **L,** change at each reh. letter		**LF**; tempo of four **L** gradually diverge
(pitch) 12-tone **W**	↑**S,** gliss., aleatoricism, mixed harmonic systems	↓**DIA** and **OCT S**	Stasis, then ↓ **CHR T**

P	Q	U	V
13'53"	15'06"	22'	23'21"
	L expands & contracts in parallel w/dyn. in each sec.	**LF**, independent tempi	
Sus. **T H**, halt on **E/B^b**	m. 113 begins numbered **H**; end on unison B	Tutti melody, counterpoint pno	Melody harmonized at P5

X	Z	J1	K1
25'24.5"	26'17"	30'42"	31'25"
Tones drop out as **L** wanes	**D**	**LF r**esume, marked "sf"	**L** sus.
↓**OCT S**	Sus. Octachord, 9 add'l quarter-tones	↑**OCT S**	Sus. **P** on E^b

N1	O1	Q1	Final **H**
32'17"	32'46"	34'42"	39'35"
		LF resume 36'00"; decrease 38'36,7"	**D**
Sus. E^b/A **T**	Sus. **P** on A	**P** ↑ G	18-tone tutti **H** on C2 in orch, **W** in pnos

Legend:

A moment of stasis at rehearsal **O** opens into a radically-slowed, fully-chromatic descent timed to the light metronome, harmonized at the tritone. Roughly a third of the way through the piece strings—followed by winds—halt on sustained tritones after rehearsal **P** (A/Eb followed by E/Bb). The stately chord progression that follows reveals subtle shifts in Haas's harmonic technique since *in vain*. Section **Q** launches a series of one hundred thirteen chords that spans the middle third of *Hyperion*, launched by a Bb/E tritone spread over five octaves in the orchestra. The first twenty chords of this progression are shown in a reduction at Figure 12. The Bb/E tritone is joined by another on B/F in chord (1) to form the interlocking Wyschnegradsky trichords contained in the opening chord, as shown in the further reduction at Figure 13 (circled tones in the reduction are not cited in the analysis). Two vertical stacks of fifth-semitone-fifth on B2 and F3 form the most common tetrachordal arrangement of (0167) in the work, indicated by a modified figured bass on the lower ossia stave of Figure 13 (I have excluded the piano interludes). This is joined by a single fifth/tritone on D2, and secondary arrangement on (0167), a tritone-semitone-tritone tetrachord on E4.

[**Figure 12**, *Hyperion*, chords 1–20 at rehearsal Q]

[**Figure 13**, *Hyperion*, analysis of chords 1–20 at rehearsal Q.]

As these chords travel in sequence from winds, to brass, to strings and back again, they are transposed and/or inverted to form additional Wyschnegradsky tetrachords, creating an octachord at (3), an 11-tone chord (missing a crucial A) at (4), and the total chromatic at chord (5). Chord (7) restricts equal-tempered tones to C, D, F and G, but adds quarter-tones above and below to create audible beats with existing equal-tempered tones.[23] Chord (7) introduces A5, while Chord (11) returns to the open spacing of stacked Wyschnegradsky trichords (from E1 to F#5). The full chromatic returns in chord (12) over E1, in an arrangement that emphasizes the Octatonic 2,3 collection in octaves 5 and 6. During this passage the four lights swell and recede as they track the dynamics of each succeeding chord. These massive harmonies prepare a shimmering chord constructed entirely of partials over A0 (15, with the first overtone as bass), retaining only Bb5—its highest tone—in common with chord (13). The A partial chord subsequently clouds over and withdraws into an ambiguously-tuned third at chord (18).[24]

Similar progressions continue in waves through rehearsal letters **R**, **S** and **T**, in parallel with the pulsing sustained lights. At chord (37) a B/F tritone in winds augmented by ad lib "extremely high" pitches in reeds alternates with Wyschnegradsky 5-1-5 trichords that

---

[23] In combination with existing equal-tempered tones, quarter-tone intervals that span 11, 12 (the tritone) and 13, but do not form perfect binary trichordal divisions.

[24] A quarter-tone nimbus from C#–D paired with F is joined by four additional quarter-tones in chord (20).

immediately expands into their 6-1-6 versions (chords 38 and 39). Percussion joins the increasing cacophony in piano, leading to a tutti unison B at chord (113). At rehearsal U this B leads a portentous monophonic melody in full orchestra accompanied by the flashing light metronome, harmonized at the fifth in a kind of organum at rehearsal **V**. The melody dissolves into descending octatonic scales at rehearsal X, as in the opening to *in vain.*

At rehearsal **Z** these scales freeze into a violently-repeated octachord constructed from three stacked Wyschnegradsky chords, augmented with nine quarter-tones as the performance space withdraws into darkness. Repetitions of these chords increase in tempo and intensity; against this a deafening tenor drum joints clusters in the pianos continually rise to the end of the keyboard and fall back. Crashing cymbals herald the return of rising octatonic scales in full orchestra at rehearsal **J**1 and the return of the light metronome. A tam-tam announces a glowing Eb1 in 6 octaves—harmonized by its third, seventh and ninth partials—held and elaborated until rehearsal **N1**, then transposed to A at rehearsal **O1**. This is followed once again by ascending scales in the orchestra formed from overtones over A (up to and including the 33rd partial), over sustained low As in tuba and contrabass.

This A chord—expanded and elaborated in staggered swells throughout the orchestra—dominates the texture until it slides up to B after rehearsal **Q1**. Here the bass drum announces a slow tutti climb, as the same partial harmony is planed through two octatonic collections, drops down an octave, and climbs again through several different equal-tempered collections *al niente*, closing with a ghostly halt on G. A 7-second pause precedes the final harmony: an apparent 24-tone microtonal harmony, composed of 18 pitch-classes in orchestra, with the remaining suggested by the inverted Wyschnegradsky harmonies (composed of tritones and fifths) in the re-tuned pianos, to gradually fade out over 25 seconds in complete darkness once again.

..

Interpreting the cultural politics of Haas's multisensory composition
Although *Hyperion* ends in pitch black, it ends triumphantly: rising to pause before replacing the bright light voices with a motley, glittering harmony that spans six octaves and several tuning

systems. By contrast, the end of *in vain* returns to the beginning in a direct representation of its title, with a nod to the tradition of still life painting known as "vanitas." The bright, untempered, asymmetrical harmonies of the work's middle section are eventually absorbed into an equal-tempered, symmetrical torrent of eternal descent, and as the sound continuum contracts, the transcendent sense of separation from the mundane experienced earlier fades. The cyclical design of *in vain*—a work that juxtaposes microtonal harmonies with equal-temperament, light with dark, and dizzying acoustic illusions with a clear formal design—seems to contradict its central premise, in the way that *vanitas* paintings juxtaposed dazzling beauty and opulence with signifiers of death and decay.[25] Haas wrote the work in a response to the formation of the black-blue government coalition between the Austrian People's Party and the right-wing Freedom Party in 1999. While audiences are often thrilled by the traditional recapitulation that closes *in vain*, Haas remarks "I cannot imagine that anyone will take this recurrence of the beginning as anything but oppressive. That's enough. Nothing more is needed."[26] Indeed, as our analysis makes clear, *in vain* does not integrate its materials, but juxtaposes microtonal harmonies with equal-temperament, light with dark, and dizzying acoustic illusions with a clear formal design. It may be reaching to suggest this exposure of paradoxes in musical notions of the natural and artificial parallels Haas's political concerns, especially when he has since rejected the original political subtext of *in vain*, claiming instead that music is incapable of expressing or spreading ideology (i.e., "there is no danger of social effect"), and that attempts by composers to assign such a program should be viewed suspiciously (i.e., "ideology is thus an advertisement").[27] Yet the fact that works like *in vain* have outlived their political moments lends credence to his general optimism that "art is ultimately stronger than the underlying political circumstances and the outcry against them."[28]

One response to the question of musical representation posed by *in vain* is offered in a

---

[25] Mark Hutchinson discusses how *in vain* evokes the aesthetics of the sublime, and their connection to the work's political context and reception history, in "Stairways in the Dark: Sound, Syntax and the Sublime in Haas's *in vain*," *Tempo* 73/288 (2019), 7–25.

[26] Georg Friedrich Haas, "On the magic of 'pure' intervals—An interview with Heinz Rögl," *Universal Edition Musikblätter* 5 (2013), 12–14.

[27] Haas, "Komponisten–Ideen und Wirklichkeitserfahrung," *Osterreichische Musikzeitschrift*, 63, nos. 8–9 (2008): 43–4.

[28] H.R., "mica-Interview mit Georg Friedrich Haas," *mica*, Nov. 1 2007, https://www.musicaustria.at/mica-interview-mit-georg-friedrich-haas/, accessed 1 July, 2021.

recent article by Max Silva, who reads the work's ideological subtext in relation to the signifying potential of sonic objects like the overtone chord.[29] For him, "heard utopia" represents one narrative, in which utopia—represented by the spectral, just-intoned, slow aspects of *in vain*, heard in the dark—is defeated by the Shepard-scale vortex formed by equal-tempered, Wyschnegradsky, and octatonic harmonies, in the light. "Utopian hearing," on the other hand, presents the work as an ethics of intonation; one that trains us, during those dark passages, to hear microtonal and just-intoned harmonies as distinct sonic objects, rather than as dissonant accidents or threats to equal temperament. From this perspective, Silva claims that Haas uses overtone chords as a "tool for encouraging utopian hearing, confronting listeners with sound that refines their appreciation of intonation and forces them to question their received listening categories."[30] His interpretation also takes into account the work's lighting effects, especially for how they rub against the "correct" ideological reading, muddying the clarity of 12-TET vs. overtone sonorities. Crucially, Silva's shift from "heard utopia" to "utopian hearing" involves translating overtone chords from iconic signs into ethical instruments that encourage a reflexive mode of listening, thereby challenging and defamiliarizing habituated modes of perception.

One might question how "defamiliarizing" Haas's use of the overtone chord really is. As a conceptual artifact, this sonority appears in many historical music theories, from Pythagorian ratios to Rameau's corps sonore and Helmholtz's vowel theory. And in contemporary music, it is now a well-worn compositional trope. Reflecting on the spread of spectral aesthetics near the end of his life, Grisey conceded that "it is no longer the time for the terrorism of utopias... we have passed the point of no return and the consequences of musical languages are sufficiently clear that other generations of composers have become interested."[31] That this reflection was posthumously published in the same year Haas composed *in vain* underscores the widespread uptake of spectral aesthetics in new music writ large, suggesting that Silva's argument about the reception of overtone chords as part of the work's underlying "ethics of defamiliarization" may be contingent on a kind of normativity that is less pertinent to contemporary music culture.

But the score does not only encode tokens and tools of utopian hearing. It gives

---

[29] Max Silva, "Heard Utopia vs Utopian Hearing: Haas's *in vain* and Political Ambivalence," *Twentieth-Century Music* 15, no. 1 (2018), 75–102.

[30] Ibid., 85.

[31] Gérard Grisey, Gérard,. "Did you say spectral?" Translated by Joshua Fineberg. *Contemporary Music Review* 19, no. 3 (2000), p. 3.

instructions that produce a particular set of spatial and temporal relations among composers, performers and listeners, instituting a model of social relations that is intrinsically political, ethical, and ideological in its design. In the case of *Hyperion* and *in vain*, the score sets up a process for real-time negotiations between members of the orchestra, lighting personnel, and their collective interpretation of underdetermined lighting cues. While Haas may act as the initial engineer and arbiter of this process, he also relinquishes a significant degree of control, building moveable molds and letting individual players decide how to fill them with content. This may at times transform the harmonic and temporal fabric of the whole, as in certain sections of *Hyperion*, where one hears not clearly articulated gestures so much as texturally differentiated masses moving at different speeds. Here, Haas plays on tensions between individual vs. group vs. totality, exposing the inner form of the music to a struggle between the organizing power of light and the messy effects of ongoing collective action. He also plays on what Cornelia Fales calls our "perceptualization" of sound,[32] in which features outside of the actual acoustic elements of a signal nonetheless contribute to its perceptual outcome. *In vain* and *Hyperion* both disorient the listener by manipulating several fundamental paradoxes of auditory perception, paramount among those our dependence on auditory images to orient our musical perception, and our unconscious use of timbre to map an acoustic environment. Whether it is the Shepard tone suggestion of an eternal descent, or the towering harmonies erected upon virtual fundamentals, Haas disturbs our sense of musical space, while at the same time using light to disturb our sense of physical space.

In the case of his electroacoustic works, the scores and their attendant technologies join forces to enact a set of performative corporeal and social relations. This is true for the process of spectral tuning between performers and electronic synthesizers in *...und...*, where instrumentalists are asked to navigate zones of the pansonorous continuum that typically remain out of reach due to the constraints of human perception and the physical limitations of playing instruments. Doing so requires a certain amount of both physical and perceptual discipline, with performers learning to hear and respond to pure intervallic structures in the electronics, and thereby inserting themselves into the larger impulse-resonance model of synthesis that informs this music. Similarly, the tape delay processes in *Ein Schattenspiel* and String Quartet No. 4 produce a set of

---

[32] Cornelia Fales, "The Paradox of Timbre," *Ethnomusicology* 46:1 (2002): 56–95.

relations; this time, one that effectively collapses time, bringing together originals and copies in a shared sonic space that poetically mirrors the plurality of microtonal systems brought together in this music. The reinjection loop acts as a form-generating device, staging interactions between performers and their delayed "shadows," while also allowing Haas to stage dialogues between a variety of microtonal traditions (and by extension, his own compositional influences and predecessors). In this way, the material and social dimensions of his electroacoustic and optical works reveal another side to Haas's ethical and ideological project: a heteroglossic discourse that brings together not only different traditions for organizing pitch space (or, in our specific examples, electroacoustic, orchestral and optical space), but different musical expressions for invoking historical, cultural, and political spaces.

A concern with social engagement persists in Haas's most recent compositions, despite his public apprehensiveness about composing explicitly political music. The clearest example is *I can't breathe* for solo trumpet (2015), a work Haas composed shortly after moving to his newly-adopted home New York City as a reaction to the tragic death of Eric Garner, who was killed on July 17, 2014 by a police chokehold.[33] Garner's last words—"I can't breathe"—became the rallying cry of a larger protest against police brutality and systemic racism, inflamed by the grand jury's decision not to indict the white police officer charged with Garner's death. That a white, male European composer appropriated these words as the title of a piece to be performed for predominantly white new music audiences has led some to critique the power dynamics encapsulated by the work. Max Erwin, for instance, has argued that *I can't breathe* "enacts a praxis of self-satisfied, self-perpetuating detachment," and that its program "extricates the subject (composer/artwork/audience) from the object of critique… [and thus] undermines any substantive action, since the hierarchy between audience and music, between subject and object, is maintained as firmly as it is in any performance of Bruckner."[34]

Erwin's position highlights the racialized structures that lurk beneath new music

---

[33] Andy Newman, "The Death of Eric Garner, and the Events That Followed," *New York Times*, Dec 4, 2014. https://www.nytimes.com/interactive/2014/12/04/nyregion/04garner-timeline.html, accessed Mar. 17, 2021. According to Haas, *I Can't Breathe* was penned immediately after Garner's death over a period of ten days; the work premiered in a performance by Dutch trumpeter Marco Blaauw of the Musikfabrik Ensemble in Cologne, Feb. 8, 2015.

[34] Max Erwin, "Here Comes Newer Despair: An Aesthetic Primer for the New Conceptualism of Johannes Kreidler," *Tempo* 70, no. 278 (2016): 5-15.

institutions, as well as classical music performance and education institutions more generally, and it points to the admitted failure of Haas's work to make any meaningful intervention at this level.[35] But at a more modest scale, in its representation of social and political experiences that have been historically excluded from classical music venues, the work does ask audiences to confront racial violence in ways that go beyond a simple programmatic treatment of the issue. Most directly, in its disturbing representation of suffocation—*I can't breathe* begins with a Kaddish in 12-tone equal-temperament, but continues with increasingly finer divisions of the octave, including sixth tones and eighth tones, before it ultimately comes to a close employing sixteenth tones that represent 1/96th of an octave.[36] This "constriction" of pitch spaces performs a dynamic process of shifting microtonal relationships that demands a parallel physical and perceptual constriction of space for both performer and listeners. During a recent dialogue on the work with composer/musicologist George Lewis and performer Marco Blaauw, the composer describes this process, saying the "Kaddish is taking away the space to breathe... you are singing freely and the space gets closer and closer."[37] Similarly, Lewis emphasizes how "the piece as a whole can be usefully contextualized as a form of pranayama, the study of the breath: a meditation on breath and life. We are asked to feel ourselves inside the breath, following its every nuance … it's like the audience can't breathe. And you, the trumpeter, evoke a sense of empathy via a kind of transubstantiation." From this perspective of embodied empathy, the mournful melody of *I can't breathe* enacts a shared sense of despair and impending doom, bridging Erwin's subject-object distance in some small way through its evocation of a sympathetic, subject-subject resonance of performer and audience with Garner's life-ending experience in that horrific moment.

Ultimately, the question of how contemporary composers can most effectively engage in

---

[35] A recent analysis of race and gender diversity at four new music festivals across Europe (MaurzMusik, Darmstadt, Donaueshingen, and Ultima) found a staggering lack of representation; for instance, between 1946 and 2014, only 334 of 4750 pieces performed at Darmstadt were composed by women, and only 2 were by non-white Afrodiasporic composers. See George Lewis, "A Small Act of Curation," *On Curating* 44 (2020), https://www.on-curating.org/issue-44-reader/a-small-act-of-curation.html?fbclid=IwAR07258l-NkEJuSecdn1dXV0pYt01jQhaMUToNWY3c06fZDL7rvWfguJ9GU#.YXSLldbMLOT.

[36] As Mike Ford has shown, this gradual shift to diminished microtonal spaces and restricted interval sizes is further tied to the image of obstructed breath by a continual shift of mutes (Haas suggests a double-bell trumpet to facilitate these changes), and by the trumpet's held notes that require the performer to go extended periods without taking a breath. See Ford, "Spectralism as activism: Georg Friedrich Haas's musical response to the death of Eric Garner," paper read at the 2017 international Spectralisms conference, Oxford University, 16 Mar 2017.

[37] George Lewis, George Friedrich Haas, and Marco Blaauw, "*I Can't Breathe*: A Virtual Dialogue," *New Music Box* (November 2020), https://nmbx.newmusicusa.org/i-cant-breathe-a-virtual-dialogue/.

social justice and cultural politics goes beyond the more limited scope of this chapter, yet it does have relevance to Haas's compositional ethics and the reception of his music as a whole. Even in a solo work like *I can't breathe*, Haas's scores facilitate a unique set of relations among composers, performers, and listeners, using manipulations of microtonal space to constitute physical, social, and political connections. And as our analyses show, his larger scores that feature optical and electroacoustic elements, as well as an increasing reliance on aleatoric and pseudo-improvisatory techniques, open new space for the creative agency of performers and less determined, emergent audio-visual experiences for the audience. These understudied aspects of Haas's compositional method are key to understanding his ongoing exploration of the different kinds of spaces that can be constructed at the interstices of pansonic and panoptical continua.