

Galactic Jamboree

for three retuned, computer-driven pianos

**by Kyle Gann
2015-16**

Technical Specifications

The 33-pitch tuning of the three pianos (the same in every octave) is as follows, given first in the number of cents above E-flat, and then as ratios to the E-flat 1/1:

Piano	1		2		3	
D	1088	15/8	977	225/128	1044	117/64
Db	969	7/4	938	55/32	906	27/16
C	857	105/64	773	25/16	840	13/8
B	738	49/32	755	99/64	729	195/128
Bb	702	3/2	590	45/32	609	91/64
A	551	11/8	551	11/8	481	169/128
Ab	471	21/16	440	165/128	408	81/64
G	386	5/4	320	77/64	342	39/32
Gb	204	9/8	275	75/64	275	75/64
F	155	35/32	192	143/128	192	143/128
E	92	135/128	53	33/32	27	65/64
Eb	0	1/1	1103	121/64	1173	63/32

Note that no string needs to be raised higher than its natural tuning except for the B-flat on piano 1, which is 2¢ sharp (or if one prefers, 2¢ could be subtracted from all quantities).

For electronic realization of the piece, it can prove helpful to reconfigure the tuning as a reference pitch in cycles per second for each piano, and ratios derived from that standard:

Tuning pitch:	38.891 cps	36.7641 cps	38.2833 cps
D	15/8	225/121	13/7
Db	7/4	20/11	12/7
C	105/64	200/121	104/63
B	49/32	18/11	65/42
Bb	3/2	180/121	13/9
A	11/8	16/11	169/126
Ab	21/16	15/11	9/7
G	5/4	14/11	26/21
F#	9/8	150/121	25/21
F	35/32	13/11	143/126
E	135/128	12/11	65/63
Eb	1/1	1/1	1/1

In the configuration of certain tuning softwares, the following sequences might facilitate getting the required tuning:

Piano 1:

38.891 = Eb0

1/1, 135/128, 35/32, 9/8, 5/4, 21/16, 11/8, 3/2, 49/32, 105/64, 7/4, 15/8

Piano 2:

36.7641485 = Eb0

1/1, 12/11, 13/11, 150/121, 14/11, 15/11, 16/11, 180/121, 18/11, 200/121, 20/11, 225/121

Piano 3:

38.283333 = Eb0

1/1, 65/63, 143/126, 25/21, 26/21, 9/7, 169/126, 13/9, 65/42, 104/63, 12/7, 13/7

For purposes of analysis, the entire scale (which I refer to as my 8x8 scale) is given below, grouping its pitches into eight harmonic series' on the 1st, 3rd, 5th, 7th, 9th, 11th, 13th, and 15th harmonics of E-flat, and naming each pitch in a typographical equivalent of Ben Johnston's just-intonation notation:

Pitch name	Ratio	Cents	1/1	3/2	5/4	7/4	9/8	11/8	13/8	15/8
Db^^-	121/64	1103						11		
D	15/8	1088	15	5	3					1
Db13	117/64	1044					13		9	
C#+	225/128	977								15
Db7	7/4	969	7			1				
C^	55/32	938			11			5		
C+	27/16	906		9			3			
C7+	105/64	857				15				7
Cb13	13/8	840	13						1	
B	25/16	773			5					
Bb^	99/64	755					11	9		
Cb77+	49/32	738				7				
Bb13	195/128	729							15	13
Bb	3/2	702	3	1						
Bbb713	91/64	609				13			7	
A+	45/32	590		15	9		5			3
Ab^	11/8	551	11					1		
Abb1313	169/128	481							13	
Ab7+	21/16	471		7		3				
G^	165/128	440						15		11
G+	81/64	408					9			
G	5/4	386	5		1					
Gb13	39/32	342		13					3	
Gb7^	77/64	320				11		7		
F#+	75/64	275			15					5
F+	9/8	204	9	3			1			
Fb13^	143/128	192						13	11	
F7+	35/32	155			7	5				
E+	135/128	92					15			9
Eb^	33/32	53		11				3		
Eb13	65/64	27			13				5	
Eb	1/1	0	1							
Eb7+	63/32	1173				9	7			

In Johnston's notation, + raises a pitch by 81/80, # raises it by 25/24, b lowers it by 24/25, 7 lowers it by 35/36, ^ raises it by 33/32, 13 raises it by 65/64, and F-A-C, C-E-G, and G-B-D are all perfectly tuned 4:5:6 major triads.

A couple of notes on listening to *Hyperchromatica*:

Some people think the piano sounds seem “funny” or “unreal.” It is essential to the timbre of a normal piano that the intervals are slightly out of tune, and surrounded by the fuzziness of the resulting beats. Remove that out-of-tuneness and the piano can sound different than you’re used to. It has always been common for me to play La Monte Young’s *The Well-Tuned Piano* for people and have them respond, “Isn’t that electronic?” “It sounds more like bells than a piano.” Often one’s unfamiliarity with pure tuning is misperceived as a deficiency in the piano sound. Relatedly, when I issued a disc of Disklavier music in 2005, people sometimes commented, “Too bad you couldn’t use a real piano, because the electronic sounds are off-putting.” In fact, the Disklavier *was* a real, acoustic piano, with pluckable strings. It was tuned to 18th-century well temperament, the notes went by *very* fast, and so the divergences from normalcy made people’s brains convince them that it was an electronic piano, which was a false perception. Give yourself some time to listen to the pieces over and over, and you’ll probably get used to them. I can guarantee, after hundreds of listenings myself, that the harmonies make their own purely-tuned sense, and that their logic sinks in once you can anticipate what’s going to happen. One of the purposes of these pieces is to expand your musical perception.

The Disklavier (computer-driven piano, the digital manifestation of the player piano) is a different medium than the human-played piano. One can, and must, write for it differently. With a couple of deliberate exceptions, these pieces are not playable by humans. The composer forbids performance by humans (which can’t happen anyway), and will not cooperate with any such attempt. The computer-driven version is the final manifestation, and the only one contemplated or permitted. These pieces were written specifically for the Disklavier medium, without any compromise in what the music was intended to achieve. If it bothers you that the music you are listening to isn’t being played by humans, there are millions of piano recordings made by humans; go listen to them. There is too much music in the world for anyone to waste time listening to any music wishing it were something other than what it is. This music is produced mechanically, for mechanical rhythmic capabilities that I savor. I make this music public on the chance that there might be a handful of other people on the planet for whom the possibilities opened up here in terms of rhythmic and harmonic language might more than compensate for the loss of a few habitual comforts. If you are not one of those rare people, you can do the composer a favor by moving on without comment.

Finally, a word about the notation. I write this music in Sibelius software, and the notation’s purpose is to create the MIDI file for performance. Sibelius’s relation to dynamics is quirky and inconsistent, and so the dynamic markings I need to generate the file can look redundant or inconsistent. Phrase markings don’t work when the melody is bouncing among different pianos. Since this is music for machines, it would be a waste of time to sprinkle the score with the conventions we use for humans (“*con affezione*”). I notate my music for humans very differently than this, and the divergences here do not stem from ignorance.

- Kyle Gann

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$\text{♩} = 88$

Piano 1

p

mf

f

$\text{♩} = 88$

Piano 3

f

f

==

2

Pno1

f

p

Pno2

f

f

f

Pno3

f

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2

3

Musical score for measures 2 and 3. The score is for three pianos (Pno1, Pno2, Pno3). Measure 2 features a complex rhythmic pattern in the right hand of Pno1, marked *p*. The left hand of Pno1 has a bass line with a slur. Pno2 has a simple rhythmic pattern. Pno3 has a few notes in the right hand, marked *f*. Measure 3 continues the patterns, with Pno1's right hand playing a dense sixteenth-note texture, marked *p*. Pno1's left hand has a bass line with a slur. Pno2 has a few notes. Pno3 has a few notes in the right hand, marked *f*. A fermata is present over the final notes of Pno1 in both measures.



4

Musical score for measures 4 and 5. The score is for three pianos (Pno1, Pno2, Pno3). Measure 4 features a complex rhythmic pattern in the right hand of Pno1, marked *p*. The left hand of Pno1 has a bass line with a slur. Pno2 has a simple rhythmic pattern. Pno3 has a few notes in the right hand, marked *f*. Measure 5 continues the patterns, with Pno1's right hand playing a dense sixteenth-note texture, marked *p*. The left hand of Pno1 has a bass line with a slur. Pno2 has a few notes. Pno3 has a few notes in the right hand, marked *f*. A fermata is present over the final notes of Pno1 in both measures.

7

The musical score is divided into three systems, each for a different piano (Pno1, Pno2, Pno3).
- **Pno1:** Features a complex rhythmic pattern in the right hand with many sixteenth notes and rests. The left hand has a steady eighth-note accompaniment. Dynamic markings include *f* and a fingering of 5.
- **Pno2:** Mostly rests, with occasional chords in the right hand and single notes in the left hand. Includes a dynamic marking of *f* and a fingering of 5.
- **Pno3:** Similar to Pno2, with rests and occasional notes. Includes dynamic markings of *f* and a fingering of 5.
The score uses treble and bass clefs and includes various musical notations such as beams, slurs, and dynamic markings.

6

8

Pno1

Pno2

Pno3

The musical score consists of three staves. Pno1 is the most active, featuring a complex rhythmic pattern with dynamics ranging from *f* to *p*. Pno2 and Pno3 have sparse, punctuated entries, both marked with *f*. The score includes various musical notations such as slurs, accents, and dynamic markings.

The image displays a musical score for three pianos, labeled Pno1, Pno2, and Pno3. The score is written in a key signature of two flats (B-flat and E-flat) and begins at measure 9. Pno1 features a complex, fast-moving melodic line in the right hand with frequent accidentals and a steady bass line. Pno2 and Pno3 have more sparse parts, with Pno2's right hand playing chords and Pno3's right hand playing chords and single notes. Dynamic markings of *f* (forte) are used throughout. The score includes various musical notations such as treble and bass clefs, notes, rests, and fingerings.

10

The musical score consists of three systems, each for a different piano part.
Pno1: The first system has four staves. The top staff contains a complex melodic line with many accidentals and slurs. The second staff has chords with dynamics *f* and *f*. The third staff has a bass line with dynamics *p*. The bottom staff has a bass line with a *b* (basso) marking.
Pno2: The second system has two staves. The top staff has a melodic line with a *5* (finger) marking and slurs. The bottom staff has chords with dynamics *f* and *f*.
Pno3: The third system has two staves. The top staff has a complex melodic line with many accidentals, slurs, and a *5* (finger) marking. The bottom staff has chords with dynamics *f* and *f*.
Throughout the score, there are numerous slurs and accents, and some measures are marked with *11* (finger) or *5* (finger).

11

Pno1

Pno2

Pno3

ff 15:10 *ff*

f *f* *ff* 15:10

f *f* 15:10 *ff*

12

Pno1

Pno2

Pno3

ff *f* *ff* *ff*

ff *mp* *p* *p*

ff

10

14

Pno1

Pno2

Pno3

15

Pno1

Pno2

Pno3

16

Pno1

p *mp* *p*

Pno2

f 5

Pno3

mp

17

Pno1

p *mp*

Pno2

p

Pno3

mp

18

Pno1

Pno2

Pno3

19

Pno1

Pno2

Pno3

20

Piano score for measures 20-23. Pno1 (Piano 1) has a complex texture with triplets and a 5:4 interval. Pno2 (Piano 2) and Pno3 (Piano 3) have simpler accompaniment. Dynamics include *f*, *p*, and *mf*.



21

Piano score for measures 21-24. Pno1 (Piano 1) features a 5:4 interval and triplets. Pno2 (Piano 2) and Pno3 (Piano 3) continue their accompaniment. Dynamics include *p*, *f*, and *mf*.

22

Pno1

Pno3

This system contains measures 22 and 23. Measure 22 features a complex piano texture. Pno1 (Piano 1) has a treble staff with a series of chords and a bass staff with a melodic line. Pno3 (Piano 3) has a treble staff with a melodic line and a bass staff with a melodic line. Measure 23 continues the texture with similar piano parts. Dynamics include *p* (piano) and *f* (forte). Fingerings like '5' and '9' are indicated. A double bar line is present at the end of measure 23.

23

Pno1

Pno2

Pno3

This system contains measures 23 and 24. Measure 23 features a complex piano texture. Pno1 (Piano 1) has a treble staff with a series of chords and a bass staff with a melodic line. Pno2 (Piano 2) has a treble staff with a melodic line and a bass staff with a melodic line. Pno3 (Piano 3) has a treble staff with a melodic line and a bass staff with a melodic line. Measure 24 continues the texture with similar piano parts. Dynamics include *f* (forte). Fingerings like '9' are indicated.

24

Pno1

Pno2

Pno3

Musical score for measures 24-25. Pno1 (Piano 1) has a treble and bass staff. The treble staff features a triplet of eighth notes with a dynamic of *f*. The bass staff has a melodic line with a dynamic of *p*. Pno2 (Piano 2) has a treble staff with a triplet of eighth notes. Pno3 (Piano 3) has a treble and bass staff, with a triplet of eighth notes in the treble. Dynamics include *p* and *f*.



25

Pno1

Pno2

Pno3

Musical score for measures 25-26. Pno1 (Piano 1) has a treble and bass staff. The treble staff has a melodic line with a dynamic of *p*. The bass staff has a melodic line with a dynamic of *f*. Pno2 (Piano 2) has a treble staff with a melodic line and a dynamic of *f*. Pno3 (Piano 3) has a treble and bass staff, with a melodic line in the treble and a dynamic of *f*.

26

Piano score for measures 26-30. The score is for three pianos (Pno1, Pno2, Pno3). Measure 26 is marked with a '26' above the first staff. Pno1 (Piano 1) has a complex texture with chords and a bass line. Pno2 (Piano 2) and Pno3 (Piano 3) have sparse accompaniment. Dynamics include *f* (forte) and *p* (piano).



27

Piano score for measures 31-35. The score is for three pianos (Pno1, Pno2, Pno3). Measure 27 is marked with a '27' above the first staff. Pno1 (Piano 1) continues with complex textures. Pno2 (Piano 2) and Pno3 (Piano 3) have sparse accompaniment. Dynamics include *f* (forte) and *p* (piano).

28 17

Pno1

Pno2

Pno3

Measure 28: Pno1 right hand has a tremolo of eighth notes. Pno1 left hand has a melodic line starting with a half note G2. Pno2 has a half note G2. Pno3 has a half note G2. Measure 29: Pno1 right hand continues tremolo. Pno1 left hand has a melodic line starting with a half note G2. Pno2 has a half note G2. Pno3 has a half note G2. Measure 30: Pno1 right hand continues tremolo. Pno1 left hand has a melodic line starting with a half note G2. Pno2 has a half note G2. Pno3 has a half note G2. Measure 31: Pno1 right hand continues tremolo. Pno1 left hand has a melodic line starting with a half note G2. Pno2 has a half note G2. Pno3 has a half note G2.

29

Pno1

Pno2

Pno3

Measure 29: Pno1 right hand has a tremolo of eighth notes. Pno1 left hand has a melodic line starting with a half note G2. Pno2 has a half note G2. Pno3 has a half note G2. Measure 30: Pno1 right hand continues tremolo. Pno1 left hand has a melodic line starting with a half note G2. Pno2 has a half note G2. Pno3 has a half note G2. Measure 31: Pno1 right hand continues tremolo. Pno1 left hand has a melodic line starting with a half note G2. Pno2 has a half note G2. Pno3 has a half note G2.

Pno1

30

3/16

Pno2

3/16

Pno3

3/16

ff

ff

ff

32

Pno1

p *mf* *p*

Pno2

f *mf* *mf*

Pno3

mf *mf*



33

Pno1

mp *mf*

Pno2

mf

Pno3

mf *mf*

20

34

Pno1

Pno2

Pno3



35

Pno1

Pno2

Pno3

36 *b*

Pno1

9

5 *f*

p

21

Pno2

5

7:6

Pno3

5 *f*

f

37

Pno1

f

9

9:7

ff

Pno2

f

9

f

f

f

f

9:7

ff

Pno3

9

f

9:7

ff

22 38 \flat

f 9:7 *mf* *mf* *p* *mf* *mf*

39

mf *mf* *mf* *mf* *mf* *mf* *mf* *mf* *p*

40 23

Pno1

mf
mf
mf
p

Pno2

mf 6:5
mf 6:5
mf 6:5

The image shows a musical score for two pianos, Pno1 and Pno2. Pno1 is the upper system, consisting of five staves. The first staff has a treble clef and a key signature of one flat (Bb). The second and third staves have a bass clef and a key signature of one flat. The fourth and fifth staves have a bass clef and a key signature of one sharp (F#). Dynamics include *mf* (mezzo-forte) and *p* (piano). Pno2 is the lower system, consisting of three staves, all with a treble clef and a key signature of one sharp. Dynamics include *mf*. A ratio of 6:5 is indicated above the notes in the second and third staves of Pno2. The page number 40 is at the top left, and 23 is at the top right.

41

Pno1

Pno2

Pno3

mf

The musical score is divided into three systems. The first system, labeled 'Pno1', consists of five staves. The top staff is a treble clef with a key signature of one flat and a common time signature. It contains a melodic line with various ornaments and slurs. The second staff is a treble clef with a key signature of one sharp and a common time signature, containing a more rhythmic line. The third and fourth staves are a grand staff (treble and bass clefs) with a key signature of one flat and a common time signature, containing a complex melodic and harmonic line. The fifth staff is a bass clef with a key signature of one flat and a common time signature, containing a bass line with a long slur. The second system, labeled 'Pno2', consists of three staves. The top staff is a treble clef with a key signature of one sharp and a common time signature, containing sparse notes with dynamic markings of *mf*. The middle staff is a treble clef with a key signature of one sharp and a common time signature, containing a melodic line with dynamic markings of *mf*. The bottom staff is a treble clef with a key signature of one sharp and a common time signature, containing a melodic line with dynamic markings of *mf*. The third system, labeled 'Pno3', consists of two staves. The top staff is a treble clef with a key signature of one sharp and a common time signature, containing sparse notes with a dynamic marking of *mf*. The bottom staff is a bass clef with a key signature of one sharp and a common time signature, containing sparse notes with a dynamic marking of *mf*.

44

Pno1

Pno2

Pno3

Detailed description: This page of a musical score, numbered 26, contains measures 44 through 47. It features three piano parts: Pno1, Pno2, and Pno3. Pno1 is the most active part, consisting of five staves. The top staff is in treble clef and contains a melodic line with eighth and sixteenth notes, including a triplet of eighth notes in measure 44. The second staff is also in treble clef and contains a similar melodic line. The third and fourth staves are in bass clef and contain a complex rhythmic accompaniment with many sixteenth notes. The fifth staff is in bass clef and contains a few notes with a long slur. Pno2 consists of three staves. The top staff is in treble clef and has mostly rests, with a few notes in measures 45 and 46. The middle staff is in treble clef and has rests in measures 44 and 45, followed by notes in measures 46 and 47. The bottom staff is in treble clef and has rests in measures 44 and 45, followed by notes in measures 46 and 47. Pno3 consists of one staff in bass clef, which has rests in measures 44 and 45, followed by notes in measures 46 and 47.

45

Pno1

p

Pno2

mf

mf

mf

mf

Pno3

mf

mf



46

Pno1

mf

mf

Pno3

47

Pno1

p



48

Pno1

p

mf

Pno3

49

p *p* *p* *p*

mf *mf* *mf*

p

Pno1

Pno3

Detailed description: This musical score page contains measures 49 through 52. It features two piano parts: Pno1 and Pno3. Pno1 is represented by five staves. The top staff of Pno1 contains a complex, fast-moving melodic line with many beamed notes. The second staff of Pno1 has a bass line with chords and rests, marked with a piano (*p*) dynamic. The third staff of Pno1 has chords and rests, marked with a mezzo-forte (*mf*) dynamic. The fourth staff of Pno1 has chords and rests, marked with a mezzo-forte (*mf*) dynamic. The fifth staff of Pno1 has a bass line with chords and rests, marked with a piano (*p*) dynamic. Pno3 is represented by a single staff at the bottom, which is mostly silent with some occasional notes and rests. The page number 49 is in the top left, and 29 is in the top right.

50

Pno1

Pno2

Pno3

51

Pno1

Pno2

Pno3

The musical score is divided into three systems, each for a different piano (Pno1, Pno2, Pno3). Each system contains three staves (treble and bass clefs). The first system (Pno1) starts in 3/16 time and changes to 7/4 time at the second measure. It features a complex melodic line in the bass clef with dynamic markings *ff* and *p*, and a series of chords in the treble clef. The second system (Pno2) also starts in 3/16 time and changes to 7/4 time, featuring dense chordal textures in the treble clef with *ff* dynamics and some melodic fragments in the bass clef. The third system (Pno3) starts in 3/16 time and changes to 7/4 time, featuring a complex melodic line in the treble clef with dynamic markings *f* and *ff*, and some chords in the bass clef. The score concludes with a final chord in the treble clef of each system.

55

The musical score is divided into three systems, each for a different piano (Pno1, Pno2, Pno3).
- **Pno1:** Features a treble clef with a key signature of two flats (Bb, Eb) and a common time signature. It includes a melodic line with slurs and a bass line with eighth-note patterns. Dynamics include *mf*.
- **Pno2:** Features a treble clef with a key signature of one sharp (F#) and a common time signature. It includes a melodic line with slurs and a bass line with chords. Dynamics include *mf*.
- **Pno3:** Features a treble clef with a key signature of one sharp (F#) and a common time signature. It includes a melodic line with slurs and a bass line with chords. Dynamics include *p* and *mf*.

56

Piano score for measures 56-57. The score is divided into three systems for Pno1, Pno2, and Pno3.

- Pno1:** Treble and Bass staves. Treble staff has a *p* dynamic marking. Bass staff has a *f* dynamic marking. A 6:5 interval is indicated.
- Pno2:** Treble and Bass staves. Treble staff has a *f* dynamic marking. Bass staff has a *p* dynamic marking. A 6:5 interval is indicated.
- Pno3:** Treble and Bass staves. Treble staff has a *mf* dynamic marking. Bass staff has a *p* dynamic marking. A 6:5 interval is indicated.



57

Piano score for measures 58-61. The score is divided into three systems for Pno1, Pno2, and Pno3.

- Pno1:** Treble and Bass staves. Treble staff has a *p* dynamic marking. Bass staff has *f* dynamic markings. A *p* dynamic marking appears at the end of the system.
- Pno2:** Treble and Bass staves. Treble staff has *f* dynamic markings. Bass staff has a *p* dynamic marking.
- Pno3:** Treble and Bass staves. Treble staff has *f* dynamic markings. Bass staff has *f* dynamic markings.

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58

Musical score for measures 58-59. The score is divided into three piano parts: Pno1, Pno2, and Pno3. Pno1 (left hand) features a complex rhythmic pattern with a triplet of eighth notes in measure 58, marked with a forte (*f*) dynamic. Pno2 (right hand) has a melodic line with a piano (*p*) dynamic in measure 58, followed by a triplet of eighth notes in measure 59, also marked *f*. Pno3 (right hand) has a melodic line with a forte (*f*) dynamic in measure 59, marked with a double bar line (*||*) and a fermata. The score includes various musical notations such as slurs, ties, and dynamic markings.



59

Musical score for measures 59-60. The score is divided into three piano parts: Pno1, Pno2, and Pno3. Pno1 (left hand) features a complex rhythmic pattern with a forte (*f*) dynamic in measure 59, followed by a piano (*p*) dynamic in measure 60. Pno2 (right hand) has a melodic line with a forte (*f*) dynamic in measure 59, followed by a piano (*p*) dynamic in measure 60. Pno3 (right hand) has a melodic line with a forte (*f*) dynamic in measure 59, followed by a piano (*p*) dynamic in measure 60. The score includes various musical notations such as slurs, ties, and dynamic markings.

60

Musical score for measures 60-61. The score is for two piano parts, Pno1 and Pno3. Pno1 consists of four staves (treble and bass clefs). Pno3 consists of two staves (treble and bass clefs). Measure 60: Pno1 Treble 1 has a whole note chord (Bb, D, F). Pno1 Bass 1 has a half note chord (Bb, D, F). Pno1 Bass 2 has a half note chord (Bb, D, F). Pno1 Bass 3 has a half note chord (Bb, D, F). Pno3 Treble has a whole note chord (Bb, D, F). Pno3 Bass has a whole note chord (Bb, D, F). Measure 61: Pno1 Treble 1 has a half note chord (Bb, D, F). Pno1 Bass 1 has a half note chord (Bb, D, F). Pno1 Bass 2 has a half note chord (Bb, D, F). Pno1 Bass 3 has a half note chord (Bb, D, F). Pno3 Treble has a half note chord (Bb, D, F). Pno3 Bass has a half note chord (Bb, D, F). Dynamics: *mp* (mezzo-piano) is marked in Pno1 Treble 1 and Pno3 Treble. *p* (piano) is marked in Pno1 Bass 1 and Pno3 Bass.



61

Musical score for measures 61-62. The score is for two piano parts, Pno1 and Pno3. Pno1 consists of four staves (treble and bass clefs). Pno3 consists of two staves (treble and bass clefs). Measure 61: Pno1 Treble 1 has a half note chord (Bb, D, F). Pno1 Bass 1 has a half note chord (Bb, D, F). Pno1 Bass 2 has a half note chord (Bb, D, F). Pno1 Bass 3 has a half note chord (Bb, D, F). Pno3 Treble has a half note chord (Bb, D, F). Pno3 Bass has a half note chord (Bb, D, F). Measure 62: Pno1 Treble 1 has a half note chord (Bb, D, F). Pno1 Bass 1 has a half note chord (Bb, D, F). Pno1 Bass 2 has a half note chord (Bb, D, F). Pno1 Bass 3 has a half note chord (Bb, D, F). Pno3 Treble has a half note chord (Bb, D, F). Pno3 Bass has a half note chord (Bb, D, F). Dynamics: *mf* (mezzo-forte) is marked in Pno1 Treble 1 and Pno1 Bass 1. *p* (piano) is marked in Pno1 Bass 2.

62

Pno1

Pno3

mf

Detailed description: The image shows a page of musical notation for two piano parts, Pno1 and Pno3. Pno1 is represented by five staves. The top staff has a treble clef and contains a series of chords with a large slur over the last two. The second staff has a soprano clef and contains a melodic line with a slur. The third and fourth staves have treble clefs and contain rhythmic patterns. The fifth staff has a bass clef and contains a complex rhythmic pattern. Pno3 is represented by four staves. The top staff has a treble clef and contains a few notes with a dynamic marking of *mf*. The second staff has a soprano clef and contains a few notes. The third and fourth staves have treble and bass clefs respectively and contain sparse notes.

63

Pno1

Pno3

p

Detailed description: This page of a musical score contains measures 63 through 68. It features two piano parts, Pno1 and Pno3. Pno1 is written on five staves (treble and bass clefs) and contains the primary melodic and harmonic material. It begins with a complex chordal texture in measure 63, followed by a series of eighth-note patterns and rests. A dynamic marking of *p* (piano) is present in measure 65. Pno3 is written on three staves (treble and bass clefs) and provides a sparse accompaniment with occasional chords and single notes. The score includes various musical notations such as beams, slurs, and dynamic markings.

Pno1

Musical score for Pno1, measures 64-73. The score consists of three staves: a grand staff (treble and bass clefs) and a separate bass clef staff. The grand staff has a treble clef with a key signature of one sharp (F#) and a bass clef with a key signature of one flat (Bb). The separate bass clef staff has a key signature of one flat (Bb). The music features a complex rhythmic pattern with many sixteenth notes and rests. A bracket labeled "15:14" spans measures 64-73. Dynamics include a forte (*f*) marking in measure 70. The piece concludes with a final chord in measure 73.

Pno2

Musical score for Pno2, measures 64-73. The score consists of four staves: a grand staff (treble and bass clefs) and two separate treble clef staves. The grand staff has a key signature of one sharp (F#) and a bass clef with a key signature of one flat (Bb). The two separate staves have a key signature of one sharp (F#). The music features a complex rhythmic pattern with many sixteenth notes and rests. A bracket labeled "15:14" spans measures 64-73. Dynamics include a forte (*f*) marking in measure 65 and a mezzo-forte (*mf*) marking in measure 64. The piece concludes with a final chord in measure 73.

Pno3

Musical score for Pno3, measures 64-73. The score consists of two staves: a grand staff (treble and bass clefs). The grand staff has a key signature of one sharp (F#) and a bass clef with a key signature of one flat (Bb). The music features a complex rhythmic pattern with many sixteenth notes and rests. A bracket labeled "15:14" spans measures 64-73. Dynamics include a mezzo-forte (*mf*) marking in measure 64. The piece concludes with a final chord in measure 73.

66

The musical score is organized into three piano parts, Pno1, Pno2, and Pno3, each with its own set of staves. Pno1 consists of five staves, Pno2 of four, and Pno3 of five. The score includes various musical notations such as treble and bass clefs, notes, rests, and dynamic markings. A prominent feature is a 9-measure phrase in the upper staves of each piano part, and several instances of a 17:14 ratio, likely indicating a specific rhythmic or melodic relationship. The key signature is one flat (B-flat), and the time signature is not explicitly shown but appears to be 4/4 based on the note values.

67

The musical score for measures 67-76 is organized into three piano parts:

- Pno1:** Consists of five staves. The top two staves are treble clef, and the bottom three are bass clef. It features complex rhythmic patterns with many rests and dynamic markings such as *p* and *9:7*.
- Pno2:** Consists of two staves, both treble clef. It includes a triplet of eighth notes in the first measure and a *9:7* marking.
- Pno3:** Consists of three staves, all treble clef. It features a melodic line with a long slur and a *9:7* marking.

Galactic Jamboree

68

7 5:4 5:4 5:4 11 11

19:14 10:7

19:14 10:7

Pno1

19:14 10:7

19:14 10:7

Pno2

7 11 11

19:14 10:7

19:14 10:7

Pno3

7 5:4 11 11

19:14 10:7

19:14

69

Pno1

Pno2

Pno3

mp

71

Pno1

Pno2

Pno3

72

Pno1

Pno2

Pno3



73

Pno1

Pno2

Pno3

74 47

Pno1

Pno2

Pno3

75

Pno1

Pno2

Pno3

76

Piano score for measures 76-77. The score is for three pianos (Pno1, Pno2, Pno3). Pno1 has a treble and bass staff. Pno2 has a treble staff. Pno3 has a treble and bass staff. Measure 76: Pno1 treble has a series of chords with dynamics *ff* and triplets. Pno1 bass has a melodic line with slurs. Pno2 treble has a melodic line starting with *f*. Pno3 treble and bass have sparse accompaniment. Measure 77: Pno1 treble has chords with dynamics *p*. Pno1 bass continues its melodic line. Pno2 treble has chords with dynamics *ff*. Pno3 treble and bass have sparse accompaniment.

77

Piano score for measures 78-79. The score is for three pianos (Pno1, Pno2, Pno3). Pno1 has a treble and bass staff. Pno2 has a treble staff. Pno3 has a treble and bass staff. Measure 78: Pno1 treble has chords with dynamics *ff* and triplets. Pno1 bass has a melodic line with slurs and dynamics *p*. Pno2 treble has chords with dynamics *ff* and triplets. Pno3 treble and bass have sparse accompaniment. Measure 79: Pno1 treble has chords with dynamics *p*. Pno1 bass continues its melodic line. Pno2 treble has chords with dynamics *ff*. Pno3 treble and bass have sparse accompaniment.

Piano score for measures 78-79. The score is divided into three parts: Pno1, Pno2, and Pno3.

Pno1: Features a complex rhythmic pattern with triplets and sixteenth notes. It includes dynamic markings *ff* and *p*. A 5-measure phrase is indicated with a bracket. A 3:2 ratio is noted at the end of the section.

Pno2: Contains a melodic line with a 5-measure phrase and a 3:2 ratio at the end.

Pno3: Provides a bass line with a 5-measure phrase.

Piano score for measures 79-80. The score is divided into three parts: Pno1, Pno2, and Pno3.

Pno1: Continues the complex rhythmic pattern. It includes dynamic markings *p* and *ff*. A 5:4 ratio is noted. A double bar line is present at the start of this section.

Pno2: Features a melodic line with a 5-measure phrase.

Pno3: Provides a bass line with a 3:2 ratio at the start.

80

Pno1

Pno2

Pno3

mp

ff

5:4

9

9

5

5

The musical score is arranged in three systems, one for each piano (Pno1, Pno2, Pno3). Pno1 has a treble and bass staff. Pno2 has a treble and bass staff. Pno3 has a treble and bass staff. The score includes various musical notations such as notes, rests, and dynamic markings. A tempo marking of *mp* is present at the bottom. Performance instructions like *ff*, *5:4*, and *9* are also included.

81 51

Pno1

p

3 5 5:4

Pno2

ff *ff* *ff* *ff*

3 5 5:4

Pno3

ff *ff*

5 5:4

82

The musical score is arranged in three systems, each for a different piano (Pno1, Pno2, Pno3). The time signature is 3/16, and the key signature has one flat (B-flat). The score begins at measure 82. Pno1 has a treble and bass staff. Pno2 has a treble and bass staff. Pno3 has a treble and bass staff. The score includes various dynamic markings such as *f*, *mp*, and *ff*, and includes repeat signs (*11*) and accents (*v*). The music is highly rhythmic and complex, with many sixteenth notes and rests.

84

Musical score for measures 84-85, Pno1 section. The score consists of five staves. The top staff is a grand staff with a treble clef and a key signature of two flats. It features a complex, fast-moving melodic line with many beamed notes and a fermata at the end. The dynamic marking is *mp*. The second staff is a grand staff with a bass clef and a key signature of two flats. It features a melodic line with a fermata at the end. The dynamic marking is *p*. The third staff is a grand staff with a bass clef and a key signature of two flats. It features a melodic line with a fermata at the end. The dynamic marking is *p*. The fourth staff is a grand staff with a bass clef and a key signature of two flats. It features a melodic line with a fermata at the end. The dynamic marking is *mp*. The fifth staff is a grand staff with a bass clef and a key signature of two flats. It features a melodic line with a fermata at the end. The dynamic marking is *mp*.

85

Musical score for measures 85-86, Pno1 section. The score consists of five staves. The top staff is a grand staff with a treble clef and a key signature of two flats. It features a complex, fast-moving melodic line with many beamed notes and a fermata at the end. The dynamic marking is *f*. The second staff is a grand staff with a bass clef and a key signature of two flats. It features a melodic line with a fermata at the end. The dynamic marking is *p*. The third staff is a grand staff with a bass clef and a key signature of two flats. It features a melodic line with a fermata at the end. The dynamic marking is *p*. The fourth staff is a grand staff with a bass clef and a key signature of two flats. It features a melodic line with a fermata at the end. The dynamic marking is *f*. The fifth staff is a grand staff with a bass clef and a key signature of two flats. It features a melodic line with a fermata at the end. The dynamic marking is *f*.

86

Pno1

Pno2

Pno3

The musical score is divided into three systems, each for a different piano (Pno1, Pno2, Pno3).
- **Pno1:** Starts at measure 86 with a treble clef. The first staff has a series of sixteenth-note chords. The second staff has a melodic line starting with a forte (*f*) dynamic. The third and fourth staves have a bass line with eighth notes and a long slur.
- **Pno2:** Features a treble clef. The first staff has a series of chords with a slur and a '5' below. The second staff has a few chords. The third and fourth staves have a bass line with a few notes, including a forte (*f*) dynamic.
- **Pno3:** Features a treble clef. The first staff has a series of chords with a slur and a '5' below. The second and third staves are mostly empty. The fourth staff has a few notes, including a forte (*f*) dynamic and a triplet of sixteenth notes.

89

Pno1

Pno2

Pno3

ff

ff

p

ff

f



90

Pno1

Pno2

Pno3

f

f

91

Pno1

Pno2

Pno3

ff

p

ff

ff

Pno1

Musical score for Pno1, measures 92-100. The score consists of four staves: two treble clefs and two bass clefs. The first treble staff contains a melodic line with slurs and repeat signs (11). The second treble staff contains chords with slurs and repeat signs (11, 15). The first bass staff contains a rhythmic line with slurs and repeat signs (11). The second bass staff contains a melodic line with slurs and repeat signs (11).

Pno2

Musical score for Pno2, measures 92-100. The score consists of two treble clefs. The first treble staff contains a melodic line with slurs and repeat signs (5, 11, 11, 11). The second treble staff contains chords with slurs and repeat signs (11, 15).

Pno3

Musical score for Pno3, measures 92-100. The score consists of two treble clefs and one bass clef. The first treble staff contains a melodic line with slurs and repeat signs (5, 5, 5, 5, 11, 11, 11). The second treble staff contains chords with slurs and repeat signs (11, 15). The bass staff contains a melodic line with slurs and repeat signs (11).

mp

The musical score is divided into three piano parts: Pno1, Pno2, and Pno3. The piece begins at measure 93 in a 3/16 time signature. Pno1 has a complex melodic line with dynamic markings of *fff*, *f*, and *p*. Pno2 and Pno3 provide harmonic support with chords and rhythmic patterns. A key signature change to 5/4 occurs at measure 94. The score includes various musical notations such as slurs, ties, and fingering numbers (5, 11, 9).

95

The musical score is divided into three systems, each with five staves. The first system (Pno1) includes a grand staff with two treble clefs and two bass clefs. The second system (Pno2) has a single treble clef staff. The third system (Pno3) has a single treble clef staff. The score is marked with dynamics such as *fff*, *mf*, and *ff*. It includes various musical notations like slurs, accents, and fingering numbers (e.g., 5, 11). The time signature changes from 3/16 to 3/4 and back to 3/16. The key signature is B-flat major.

98

Pno1

Pno2

Pno3

The musical score for three pianos (Pno1, Pno2, Pno3) is presented in 4/4 time, starting at measure 98. The key signature consists of one sharp (F#) and one flat (Bb). The score is characterized by complex textures, including many chords and arpeggios. Pno1 features a treble staff with dense chordal textures and a bass staff with a melodic line. Pno2 has a treble staff with sparse notes and a bass staff with dense chordal textures. Pno3 has a treble staff with a melodic line and a bass staff with dense chordal textures. Dynamics include p (piano) and mf (mezzo-forte). Fingerings of 5 are indicated for several notes.

Pno1

Musical score for Pno1, measures 99-102. The score is written in 3/4 time and consists of five staves. The first two staves are treble clef, and the last three are bass clef. The music is marked with *fff* and includes dynamic markings *ff* and *ff*. There are numerous slurs and fingering numbers (5, 10, 11) throughout the piece.

Pno2

Musical score for Pno2, measures 99-102. The score is written in 3/4 time and consists of five staves. The first two staves are treble clef, and the last three are bass clef. The music is marked with *fff* and includes dynamic markings *ff* and *ff*. There are numerous slurs and fingering numbers (5, 10, 11) throughout the piece.

Pno3

Musical score for Pno3, measures 99-102. The score is written in 3/4 time and consists of five staves. The first two staves are treble clef, and the last three are bass clef. The music is marked with *ff* and includes dynamic markings *fff* and *fff*. There are numerous slurs and fingering numbers (5, 10, 11) throughout the piece.