

# Music At The Planck Scale

The Perimeter Institute Orchestra

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**A** ♩ = 102 Tempo follows LHC beam energy upgrades over time

5

10

Musical score for Flute and Piano in section A. The Flute part begins at measure 5 with a *pp* dynamic. The Piano part features a complex rhythmic pattern with chords: Cm/Eb, Ab/C, Ebm, Bbm, Fm, Cm, Ab, Ebm, Bbm. The tempo is marked as ♩ = 102.

**B** ♩ = 111

15

Musical score for Flute, Horn, and Piano in section B. The Flute and Horn parts feature triplets. The Piano part includes chords: Amaj7, Emaj7, C7(#5), Fm, Gb, Fm, Gb, Db. Dynamics include *pp* and *p*. The tempo is marked as ♩ = 111.

♩ = 120

Musical score for Flute, Clarinet, and Piano in section C. The Flute and Clarinet parts feature triplets. The Piano part includes chords: Dmaj7, C7(#5), Fm, Gb, Fm, Gb, Ebm, Bbm, Ebm, Bbm. Dynamics include *pp* and *mp*. The tempo is marked as ♩ = 120.

Full Score

♩ = 115

35 **C** ♩ = 111

Fl.

Cl.

Hn.

Tpt.

Piano

*p* *pp* *mp*

A<sup>m</sup>7 E<sup>m</sup>7 C7(#5) C<sup>m</sup> A<sup>b</sup> E<sup>b</sup>m B<sup>b</sup>m



40

Fl.

Cl.

Alto Sax.

Piano

Vln. I

Vln. II

*p* *p* *p*

F<sup>m</sup> C<sup>m</sup> A<sup>b</sup> E<sup>b</sup>m B<sup>b</sup>m

45

♩ = 93

**D** ♩ = 115

50

Fl.

Cl.

Alto Sax.

Hn.

Piano

Vln. I

Vln. II

Vla.

Vc.

*p* *mp* *p* *pp* *p*

*A* *E* *C7(#5)* *Fm* *Gb* *Fm* *Gb* *Db*

3 3 3 3 3 3 3 3

Full Score

55 E ♩ = 115 accel. 60 125

Picc. *p* *f*

Fl. *p* *f*

Cl. *p* *f*

Alto Sax. *p* *f*

Hn. *p* *f*

Piano *pp* *f*

Dmaj7 C7(#5) Fm Gb Fm Gb Ebm Bbm Ebm Bbm

Vln. I *p* *f*

Vln. II *p* *f*

Vla. *p* *f*

Vc. *p* *f*

5

65  $\text{♩} = 115$  **F**  $\text{♩} = 127$  70 75

Picc.  
Fl.  
Cl.  
Alto Sax.  
Hn.  
Tpt.  
Piano  
Vln. I  
Vln. II  
Vla.  
Vc.

*A*<sup>maj7</sup> *E*<sup>maj7</sup> *C*<sup>7(#5)</sup> *D*<sup>m7</sup> *F*<sup>maj7</sup> *A*<sup>m7</sup> *C* *B*<sup>b</sup>*maj7* *G*<sup>m7</sup> *A*<sup>b</sup>*maj7*

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

♩ = 135 accel.  
**G**

Full Score

80 85

Picc. *ppp* *pp* *p* *mp*

Fl. *ppp* *pp* *p* *mp*

Cl. *ppp* *pp* *p* *mp*

Alto Sax. *ppp* *pp* *p* *mp*

Hn. *ppp* *pp* *p* *mp*

Piano *ppp* *pp* *p* *mp*

Vln. I *ppp* *pp* *p* *mp*

Vln. II *ppp* *pp* *p* *mp*

Vla. *ppp* *pp* *p* *mp*

Vc. *ppp* *pp* *p* *mp*

*Fm7* *Dm7* *Fmaj7* *Am7* *C* *Bbmaj7* *Gm7* *Abmaj7* *Fm7* *Abmaj7* *Fm7*



*♩* = 140 ritard.

100

Picc. *fff* *p*

Fl. *fff* *p*

Cl. *fff* *p*

Alto Sax. *fff* *p*

Hn. *fff* *p*

Tpt. *fff* *p*

Piano *fff* *mf* *Emaj7* *D#* *3* *3* *3* *3* *6* *8va*

Vln. I *fff* *p*

Vln. II *fff* *p*

Vla. *fff* *p*

Vc. *fff* *p*

*♩* = 140 ritard.

**I** 105 110

Hn.  $\text{♩} = 102$  *pp*

Piano *p*  
 Cm/Eb Ab/C Ebm Bbm Fm Cm Ab Ebm Bbm

Vc.  $\text{♩} = 102$  *pp*



$\text{♩} = 123$  accel. **J** 120

Hn. 115

Piano *ppp* *pp*  
 Amaj7 Emaj7 C#m C#m Emaj7/B Amaj7 G#m7 C#m Emaj7/B

Vln. I *pp*

Vc.  $\text{♩} = 123$  accel. **J**

125 130 135 102

Picc. *p mp mf*

Fl. *p mp mf*

Cl. *p mp mf*

Alto Sax. *mp mf*

Hn. *pp p mp mf*

Tpt. *mp mf*

Piano *p mp mf*

Vln. I *p mp mf*

Vln. II *mp mf*

Vla. *p mp mf*

Vc. *pp p mp mf*

*A<sup>maj7</sup> E B/D<sup>#</sup> C<sup>#m</sup> E<sup>maj7</sup>/B A<sup>maj7</sup> G<sup>#m7</sup> C<sup>#m</sup> E<sup>maj7</sup>/B A<sup>maj7</sup> E B/D<sup>#</sup> C<sup>#m</sup>*

*♩ = 135 135 ♩ = 102*

**K** ♩ = 102 accel. 140

145

The musical score is arranged in a standard orchestral layout. The woodwind section (Picc., Fl., Cl., Alto Sax.) and brass section (Hn., Tpt.) are in the upper staves, with the Piano in the middle. The string section (Vln. I, Vln. II, Vla., Vc.) is in the lower staves. The score is divided into two systems by a double bar line. The first system shows the initial key signature and tempo. The second system begins with a key signature change to B-flat major and includes a *pp* dynamic marking for the Piano. The Piano part features a complex rhythmic pattern in the right hand and a sustained chordal texture in the left hand. The string section provides a harmonic foundation with sustained notes and a steady pulse. The woodwind and brass parts are mostly silent in this section, with the Flute playing a melodic line in the second system.

Full Score

12

The musical score consists of six staves. The Flute (Fl.) staff is at the top, followed by the Piano staff, and then the string section (Violin I, Violin II, Viola, and Violoncello) at the bottom. The Flute and Piano parts feature a melodic line with eighth notes and rests, with a dynamic marking of *p*. The Piano staff includes a series of chords: Cm, A<sup>b</sup>maj7, Fm7, G<sup>b</sup>, Cm, A<sup>b</sup>maj7, Fm7, and G<sup>b</sup>. The string section (Violin I, Violin II, Viola, and Violoncello) plays sustained notes with a dynamic marking of *p*. A rehearsal mark 'L' is placed at the beginning of the Flute staff. The tempo marking '150' is located above the Flute staff. The key signature is three flats (B-flat major/C minor).

155 **M** 160 165

Fl. *p*

Cl. *p*

Hn.

Piano *p*

Ebm Db Ab7/C Abm7/Cb Ebm Db Ab7/C Cbmaj7 Gmaj7

Vln. I **M** *p*

Vln. II *p*

Vla. *p*

Vc. *p*

♩ = 114 Full Score  
N

170

175

Picc. Fl. Cl. Alto Sax. Hn. Tpt. Piano Vln. I Vln. II Vla. Vc.

Chords: Fmaj7, Gbmaj7(b5), Cm, Abmaj7, Fm7, Gb, Cm, Abmaj7

Tempo: ♩ = 114 accel.

Rehearsal Mark: N

O

180

185

This musical score page features ten staves for various instruments. The Piccolo staff is mostly silent, with a few notes at the end. The Flute, Clarinet, and Alto Saxophone parts are active, with a dynamic marking of *mp*. The Horn part consists of sustained notes. The Piano part includes a series of chords: Fm7, Gb, Ebm, Db, Ab7/C, Abm7/Cb, Ebm, Db, Ab7/C, and Abm7/Cb. The Violin I, Violin II, and Viola parts are active with a dynamic marking of *mp*. The Cello part consists of sustained notes with a dynamic marking of *mp*. A circled 'O' is placed above the Flute staff at the beginning of the section.

**P** *190* *195*

Picc.  
Fl.  
Cl.  
Alto Sax.  
Hn.  
Tpt.  
Piano  
Vln. I  
Vln. II  
Vla.  
Vc.

*Abm* *Abm/Gb* *Fø7* *Fbmaj7* *Abm* *G+* *Abm/Gb* *Fø7* *Fbmaj7(b5)*

♩ = 125 accel.

**Q**

200

205

Picc. Fl. Cl. Alto Sax. Hn. Tpt. Piano Vln. I Vln. II Vla. Vc.

Dynamics: *p*

Chords: Fm, Cm/Eb, D<sup>b</sup>maj7, B<sup>b</sup>m

Performance markings: **Q**, *p*, *accel.*

The score is for a full orchestra. The woodwinds (Piccolo, Flute, Clarinet, Alto Saxophone, Horn, Trumpet) and strings (Violin I, Violin II, Viola, Violoncello) are mostly silent in this section. The Piano part features a complex rhythmic pattern with chords and a melodic line in the right hand. The Horn and Trumpet parts have some activity starting around measure 200.

**R**

210

Picc. *mp*  
 Fl. *p* *mf*  
 Cl. *mp*  
 Alto Sax. *mp*  
 Hn. *p* *mf*  
 Piano *mp*  
 Vln. I *mp*  
 Vln. II *mp*  
 Vla. *mp*  
 Vc. *mp*

Chords: G $\flat$ , E $\flat$ m7, D $\flat$ m/F $\flat$ , D $\flat$ m, G $\flat$ , B $\flat$ m, C $\flat$ maj7, C

**R**

**S** ♩ = 131 accel. 215 220

**Picc.** *mf*

**Fl.** *mf*

**Cl.** *mf*

**Alto Sax.** *mf*

**Hn.** *mf*

**Piano** *mf*

**Vln. I** *mf*

**Vln. II** *mf*

**Vla.** *mf*

**Vc.** *mf*

**Chords:** Cm, Abmaj7, Fm7, Gb

225

**T**

Picc. *mf*

Fl. *mf*

Cl. *mf*

Alto Sax. *mf*

Hn. *mf*

Piano *f*

Ebm Db Ab7/C Abm7/Cb Ebm Db Ab7/C Abm7/Cb

Vln. I *p* *mp* *mf*

Vln. II *p* *mp* *mf*

Vla. *p* *mp* *mf*

Vc. *mf*

*8va*

230 **U** 235 21

The score consists of ten staves. The woodwind section (Picc., Fl., Cl., Alto Sax., Hn.) and Piano part feature complex rhythmic patterns with frequent accents and slurs. Dynamics range from *f* to *mp*. The string section (Vln. I, Vln. II, Vla., Vc.) plays sustained notes with dynamic markings of *f*, *mf*, and *mp*. The Piano part includes chordal textures with specific voicings and a bass line with eighth-note patterns. A rehearsal mark 'U' is placed at the beginning of the score, and another 'U' is placed above the first staff at measure 230. A '8va' marking is present above the Vln. I staff at the end of the score.

♩ = 142 accel.

Full Score

240 **V** 245

Picc. *f* *ff* *fff*

Fl. *f* *ff* *fff*

Cl. *f* *ff* *fff*

Alto Sax. *f* *ff* *fff*

Hn. *f* *ff* *fff*

Tpt. *f* *ff* *fff*

Piano *f* *ff* *fff*

Abm Abm/Gb Db7 Fbmaj7 Abm Abm/Gb Fbmaj7 Dbm

Vln. I *f* *ff* *fff*

Vln. II *f* *ff* *fff*

Vla. *f* *ff* *fff*

Vc. *f* *ff* *fff*

♩ = 142 accel.

**V**

250 **W** 255 260

Picc. Fl. Cl. Hn. Piano Vln. I Vla. Vc.

*pp* *p* *mp* *mp* *p* *mp*

C#m Emaj7/B Amaj7 G#m7 C#m Emaj7/B Amaj7 E B/D# C#m Emaj7/B Amaj7 G#m7

♩ = 145 accel. **W**

♩ = 151 accel. Full Score

265 **X** 270

Picc. *mf* *f* *mf* *f* *ff* *8va*

Fl. *mf* *f* *mf* *f* *ff* *8va*

Cl. *mf* *f* *mf* *f* *ff* *8va*

Alto Sax. *mf* *f* *mf* *f* *ff* *8va*

Hn. *mf* *f* *mf* *f* *ff*

Tpt. *mf* *f* *mf* *f* *ff*

Piano *mf* *f* *mf* *f* *ff*

C#m Emaj7/B Amaj7 E B/D# D C#m Bm7

8<sup>va</sup> 8<sup>va</sup> 8<sup>va</sup> 8<sup>va</sup> 8<sup>va</sup> 8<sup>va</sup>

♩ = 151 accel. **X**

Vln. I *mf* *f* *mf* *f* *ff* *8va*

Vln. II *mf* *f* *mf* *f* *ff* *8va*

Vla. *mf* *f* *mf* *f* *ff*

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

Y ♩ = 119

♩ = 105 280

Picc. *fff* ⑧ 275

Fl. *fff* ⑧ 3

Cl. *fff* ⑧ 3

Alto Sax. *fff* ⑧ 3

Hn. *fff*

Tpt. *fff*

Piano *fff* B♭maj7 ④ 3 Gm Eb A♭maj7 *f* mf (b) A♭

Vln. I *fff* ④ 3 *f* *mf* ♩ = 119 ♩ = 105

Vln. II *fff* ⑧ ④ 3 *f* *mf*

Vla. *fff* ④ 3 *f* *mf*

Vc. *fff* *f* *mf*

Full Score

The musical score consists of five staves. The Piano part is in the upper left, with chord symbols  $Fm^7$ ,  $A^b$ ,  $Fm^7$ ,  $G^b$ ,  $E^b m^6$  (with  $285$  below it),  $D^b m^7$ , and  $C^b m^7$  above the staff. The Vln. I and Vln. II parts are in the middle, with a  $3$  marking above the Vln. II staff. The Vla. and Vc. parts are in the lower right. The score includes various musical notations such as notes, rests, and slurs. A  $8va$  marking is present above the final measure of the Piano staff.

**Z**  $\text{♩} = 99$  290 295

Picc. *mf* *f* *ff*

Fl. *mf* *f* *ff*

Cl. *mf* *f* *ff*

Alto Sax. *mf* *f* *ff*

Hn. *mf* *f* *ff*

Tpt. *mf* *f* *ff*

Piano *mf* *f* *ff*

**Z**  $\text{♩} = 99$  <sup>8va</sup>

Vln. I *mf* *f* *ff*

Vln. II *mf* *f* *ff*

Vla. *mf* *f* *ff*

Vc. *mf* *f* *ff*

Ab Fm7 Ab Fm7 Db Bbm Gb

Tempo: ♩ = 65  
300

Picc. *mf* *f* *ff*

Fl. *mf* *f* *ff*

Cl. *mf* *f* *ff*

Alto Sax. *mf* *f* *ff*

Hn. *mf* *f* *ff*

Tpt. *mf* *f* *ff*

Piano *mf* *f* *ff*

Chords: Ebm, D<sup>b</sup>maj7, C<sup>b</sup>maj7, Am(maj7), Emaj7

Vln. I *mf* *f* *ff*

Vln. II *mf* *f* *ff*

Vla. *mf* *f* *ff*

Vc. *mf* *f* *ff*

8va