

# *Fantasy on Active Galaxies*

*by*

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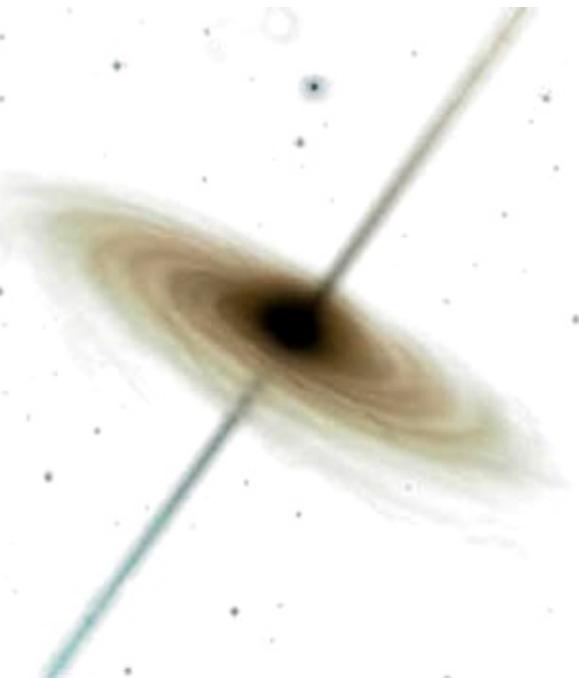


Image Credit: NASA

*Fantasy on Active Galaxies* is a set of four short pieces for flute choir that are derived from scientific data. The measurements track the fluctuating brightness of glowing gas around the supermassive black holes at the centers of four nearby galaxies, and are used to determine the gravitational force of the black hole, thereby “weighing” it.

For each galaxy, the brightness levels were assigned to musical tones within a specific key signature, with low notes corresponding to faint measurements and high notes corresponding to bright measurements. The brightening and dimming of the glowing gas give the music its shape.

The scientific data from which these pieces are derived are published in:

Bentz, M. C. et al. 2009, *The Astrophysical Journal*, Volume 705, pg. 199-217  
Bentz, M. C. et al. 2010, *The Astrophysical Journal*, Volume 716, pg. 993-1011

# Arp151

Misty Bentz

Piccolo

Flute 1

Flute 2

Alto

Flute 3

Bass

This section of the score features six staves. The Piccolo staff begins with a quarter note followed by an eighth note. The subsequent measures show various eighth-note patterns. The Flute 1, Flute 2, Alto, Flute 3, and Bass staves all begin with a half note. Measures 1 through 5 show a repeating pattern of eighth notes. Measure 6 begins with a half note, followed by an eighth note, then a quarter note, and finally an eighth note.

Picc.

Fl. 1

Fl. 2

Fl. 3

This section of the score features four staves. The Picc. staff has a melodic line consisting of eighth and sixteenth notes. The Fl. 1, Fl. 2, and Fl. 3 staves provide harmonic support with sustained notes and eighth-note patterns. Measures 1 through 5 show a repeating pattern of eighth notes. Measure 6 begins with a half note, followed by an eighth note, then a quarter note, and finally an eighth note.

2

Arp151

This musical score excerpt shows four staves: Picc. (Piccolo), Fl. 1 (Flute 1), Fl. 2 (Flute 2), and Fl. 3 (Flute 3). The music is in common time. Measure 2 begins with a forte dynamic (f). The Picc. and Fl. 1 staves play eighth-note patterns. The Fl. 2 staff has a sustained note followed by eighth-note pairs. The Fl. 3 staff has a sustained note followed by eighth-note pairs. Measures 3 and 4 show similar patterns with some variations in dynamics and note values.

Musical score for four woodwind instruments (Picc., Fl. 1, Fl. 2, Fl. 3) in G major (indicated by the treble clef) and common time (indicated by the 'C'). The score consists of four staves. The Picc. staff begins with a forte dynamic (F) followed by a half note. The Fl. 1 staff follows with eighth-note patterns. The Fl. 2 staff begins with a quarter note and includes a melodic line with grace notes. The Fl. 3 staff concludes the measure with a half note. Measures 2-4 show sustained notes (half notes) with slurs and grace notes. Measures 5-6 show eighth-note patterns. Measures 7-8 show sustained notes (half notes) with slurs and grace notes.

# NGC5548

Misty Bentz

Piccolo

Flute 1

Flute 2

Alto

Flute 3

Bass

This section of the musical score includes six staves. The top staff is for the Piccolo, followed by Flute 1, Flute 2, Alto, Flute 3, and Bass at the bottom. The key signature is four flats, and the time signature is common time (4/4). The music consists of several measures of notes and rests, with some notes having horizontal lines above or below them.

Picc.

Fl. 1

Fl. 2

Fl. 3

This section of the musical score includes four staves. The top staff is for Picc., followed by Fl. 1, Fl. 2, and Fl. 3 at the bottom. The key signature is four flats, and the time signature is common time (4/4). The music consists of several measures of notes and rests, with some notes having horizontal lines above or below them.

2

NGC5548

Picc.

Fl. 1

Fl. 2

Fl. 3

This musical score for woodwind instruments consists of two systems of four measures each. The instrumentation includes Picc. (Piccolo), Fl. 1 (Flute 1), Fl. 2 (Flute 2), and Fl. 3 (Flute 3). The key signature is B-flat major (two flats). Measure 1: Picc. rests, Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 2: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 3: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 4: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 5: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 6: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 7: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 8: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note.

Picc.

Fl. 1

Fl. 2

Fl. 3

This continuation of the musical score for woodwind instruments consists of two systems of four measures each. The instrumentation remains the same: Picc., Fl. 1, Fl. 2, and Fl. 3. The key signature is B-flat major (two flats). Measure 1: Picc. eighth note, Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 2: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 3: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 4: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 5: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 6: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 7: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note. Measure 8: Fl. 1 eighth note, Fl. 2 eighth note, Fl. 3 eighth note.

# NGC6814

Misty Bentz

A musical score for five woodwind instruments: Piccolo, Flute 1, Flute 2, Alto, and Bass. The score is in 4/4 time with a key signature of two sharps. The Piccolo part features a series of eighth-note patterns. The Flute 1 part includes a sixteenth-note cluster and sustained notes. The Flute 2 part has a sustained note followed by eighth-note pairs. The Alto part consists of eighth-note pairs. The Bass part features eighth-note pairs and sustained notes. The piece concludes with a melodic line for the Bass instrument.

Piccolo

Flute 1

Flute 2

Alto

Flute 3  
Bass

A continuation of the musical score for four woodwind instruments: Piccolo, Flute 1, Flute 2, and Flute 3. The score is in 4/4 time with a key signature of two sharps. The Piccolo part begins with a sustained note followed by eighth-note pairs. The Flute 1 part features eighth-note pairs and sustained notes. The Flute 2 part has eighth-note pairs. The Flute 3 part consists of eighth-note pairs. The piece concludes with a melodic line for the Flute 3 instrument.

Picc.

Fl. 1

Fl. 2

Fl. 3

2

## NGC6814

Picc.

Fl. 1

Fl. 2

Fl. 3

Musical score for four woodwind instruments (Picc., Fl. 1, Fl. 2, and Fl. 3) in G major (two sharps). The score consists of four staves. Picc. starts with a eighth note followed by two quarter notes. Fl. 1 starts with a dotted half note. Fl. 2 starts with a dotted half note followed by a quarter note. Fl. 3 starts with a dotted half note. Measures 2-3 show a repeating pattern of quarter notes for each instrument. Measures 4-5 show a continuation of the pattern. Measures 6-7 show a continuation of the pattern. Measures 8-9 show a continuation of the pattern.

# SBS1116+583A

Misty Bentz

Musical score for five parts: Piccolo, Flute 1, Flute 2, Alto, and Bass. The score consists of five staves. The Piccolo staff starts with a treble clef, four sharps, and a common time signature. The Flute 1 staff follows with a treble clef, four sharps, and a common time signature. The Flute 2 staff starts with a treble clef, four sharps, and a common time signature. The Alto staff follows with a treble clef, four sharps, and a common time signature. The Bass staff starts with a bass clef, four sharps, and a common time signature. The music includes various note heads, rests, and dynamic markings such as  $p$  (piano) and  $f$  (forte). The score is set against a background of vertical bar lines.

Musical score for four woodwind instruments (Picc., Fl. 1, Fl. 2, Fl. 3) in G major (three sharps). The score consists of two staves per instrument, with measures 1-4 and 5-8 shown. Measures 1-4 include dynamic markings: piano (p), forte (f), and mezzo-forte (mf). Measures 5-8 include dynamic markings: forte (f), piano (p), and mezzo-forte (mf).

Picc.

Fl. 1

Fl. 2

Fl. 3

2

SBS1116+583A

Picc.

Fl. 1

Fl. 2

Fl. 3

This musical score consists of four staves. The top staff is for the Piccolo (Picc.), followed by three Flute staves (Fl. 1, Fl. 2, Fl. 3). The music is in common time with a key signature of four sharps. Measures 2-3 show eighth-note patterns. Measures 4-5 show sustained notes with grace notes. Measures 6-7 show eighth-note patterns again. Measure 8 concludes the section.

Picc.

Fl. 1

Fl. 2

Fl. 3

This continuation of the musical score consists of four staves. The top staff is for the Piccolo (Picc.), followed by three Flute staves (Fl. 1, Fl. 2, Fl. 3). The music continues from measure 8. Measures 8-9 show sustained notes with grace notes. Measures 10-11 show eighth-note patterns. Measures 12-13 conclude the section. Slurs and grace notes are used in the flute parts.