

**TWO LIVE CONCERT PERFORMANCES**  
**Jung Hee Choi**  
***Tonecycle Base 30 Hz, 2:3:7 Vocal Version***  
**Saturdays, September 7 and 14, 2013, 9 pm**

**La Monte Young, voice**  
**Marian Zazeela, voice**  
**Jung Hee Choi, voice**  
**sine wave frequencies**

**MELA Foundation *Dream House***

**275 Church Street, 3rd Floor, between Franklin & White Streets in Tribeca**

**Admission \$24. MELA Members, Seniors, Student ID, \$18.**

**Limited seating. Advance reservations recommended.**

**Info and reservations: [mail@melafoundation.org](mailto:mail@melafoundation.org) (or 212-219-3019)**

**The installation will be open from 2 to 6 pm on Saturdays, September 7 and 14.**

**Doors will reopen at 8:30 for concert seating.**

In the transcendent setting of Jung Hee Choi's exhibition *Ahata Anahata, Manifest Unmanifest VII*, MELA Foundation is presenting two live concert performances of her composition, *Tonecycle Base 30 Hz, 2:3:7 Vocal Version*, with La Monte Young, Marian Zazeela and Jung Hee Choi, voices, and sine wave frequencies, on Saturday evenings, September 7 and 14 at 9 pm in the MELA *Dream House*. The three vocalists improvise over the implied tonic that changes imperceptibly throughout the performance of the composition. The relationship of their improvisations to the drone continuously elaborates the musical meaning of the pitch, creating a compelling, harmonious construct that draws the listener into a profoundly contemplative world. Choi writes:

*Tonecycle Base 30 Hz, 2:3:7 Vocal Version* consists of the linear superposition of 77 sine wave frequencies and 6 channels of voices based on the invariant harmonic ratios of 2, 3 and 7, all ascending imperceptibly to fixed frequencies and then descending to the starting frequencies. For each of eleven sine wave frequency components there are seven sine wave frequency components that have the same starting point (unison) as one of the original seven. However, the sine waves having the same unison starting point gradually separate while moving in the same direction at slightly different rates of speed. These extremely close frequencies and their harmonics constantly produce beat cycles that traverse through a continuum of phase angles. Since sound interacts with physical objects and other sound waves, and the energy flow of the sine waves is preserved and continues to propagate, the waves interfere with each other at any given point in space and the algebraic sum of this simple linear equation of frequencies and amplitudes creates very complex interference patterns. Depending on the relative phase and the distance each wave has to travel in the space, the placement of the waves varies according to their wavelengths and the phase relationships between the waves also vary spatially.

In this linear superposition of 77 sine wave frequencies, there is no traditional musical pitch, where pitch is defined to be a specific fixed frequency of at least a minimum duration. Further, although there is no fixed drone in this composition, a tonic is implied because the frequencies based on the harmonics 2, 3 and 7 begin at fixed points, travel imperceptibly to other fixed points and return imperceptibly to the same fixed points of origin. However, this sense of tonic is very subtle because the sine waves never stand on the lowest points of origin or the highest

points of ascent. A frequency with the starting value of 60 Hz ascends 0.0000463 Hz per second and therefore is not in one place long enough to satisfy the definition of a musical pitch. Since all tones are ascending or descending together, some in fixed ratios to create parallel motion and some not in fixed ratios to create similar motion, and since there is no reference tone (drone) or fixed tonic with which to compare, the sense of the pitch shift is practically imperceptible. Instead, the gradual development of distinctive melodic and rhythmic patterns emerges over time as the result of the acoustical phenomenon of phase interference. Nonetheless, each melodic pattern (recognizable sequence of pitches) is infinitesimally higher and faster or lower and slower than the preceding pattern, while the pitch relationships within the pattern remain the same.

For this Vocal Version I used the sound generated by the 77 sine wave frequencies and their gradual development of distinctive melodic and rhythmic patterns as the underlying *cantus firmus*-like drone and added six channels of the overlaid voices of three performers, La Monte Young, Marian Zazeela and Jung Hee Choi improvising over the implied tonic in harmonic ratios based on 2, 3 and 7. The performers were asked to sing intuitively responding to the imperceptible movement of the tones and to each other. This combination of pitch material generated a remarkable array of harmonics. The relationships of the improvisations to the tones were constantly evolving since all tones are in motion and each melodic pattern is infinitesimally higher and faster or lower and slower than the preceding pattern, while the pitch relationships of the improvisations to the tones remain the same.

Music is a relationship of sounds. In Indian music and all modal music, each pitch of a modal scale is determined in relation to the tonic. In Indian classical music, a pitch is not always a fixed frequency but its relationship to the drone determines the musical meaning of the pitch. This openness and wide range of possibilities allows improvising performers to have some control over the scale and to express subtle microtonal articulations of the pitches of the mode in which the raga is set.

The harmonic series extends beyond the limits of our perception and each set of harmonically related pitches produces a particular set of combination tones that together create a unique musical essence. Amidst the infinite shift of tones in *Tonecycle Base 30 Hz, 2:3:7*, both the fundamental and its relative pitches in invariant ratios, can be considered isomorphic to the infinite possibilities of a unique essence. (From Exhibition Catalogue, copyright © Jung Hee Choi 2012)

However, even though all 77 sine waves are continuously moving, and even though the 2nd, 3rd, 7th harmonics and their octave multiples from time to time demonstrate rhythmic and melodic permutations and recombinations in gradually changing tempi, there is absolutely no sense of pitch shift at all but instead there is a powerful auditory illusion to all listeners that the drone frequencies based on the harmonic relationships 2, 3 and 7 are absolutely stable. Both the listeners in the audience and the performers hear the illusion of a very stable drone chord with only occasional acoustical beats in the form of long, very slow phase shifts.

In the accompanying exhibition catalog, Young and Zazeela observed that through this example of auditory illusion, Choi has demonstrated that the *Maya* of illusion is continuously perpetuated as a result of the body's self-limiting and locked-in modes of perception, analysis and cerebral cognition, outside of which perhaps we can never escape.

In his LA Times Blog, critic Mark Swed wrote of the Ensemble's 2009 performance of the Maha Mrityunjaya Mantra in *Raga Sindh Bhairavi*:

"Frankly, what made me drop everything and fly to New York at the last minute for the [Merce Cunningham] memorial was the announcement of the music lineup, which was a once-in-a-lifetime gathering. La Monte Young, the otherworldly inventor of Minimalism, began the program singing a welcoming raga with Marian Zazeela and Jung Hee Choi, which was pure vibratory magic."

Concert admission is \$24 / \$18 MELA members; seniors; students with ID. **Limited seating. Advance reservations recommended.** For further information and reservations, 212-219-3019, email [mail@melafoundation.org](mailto:mail@melafoundation.org) or visit [www.melafoundation.org](http://www.melafoundation.org)