

Exploring the Lalitha Sahasranamam (Where Spirituality guides Science)

Sai Venkatesh Balasubramanian

CeNSE, SEEE, SASTRA, Thanjavur-613401, Tamilnadu, India (s.venky30@gmail.com)

Abstract

The Hindu Philosophy is an ancient one that has apart, from influencing most philosophies in East and Southeast Asia, withstood the test of time for thousands of years, and as in the past, still continues to influence every aspect of the lives of more than a billion people. It is therefore only logical that the philosophies and wisdom gained in this philosophy can be put to good use in understanding some of the deepest, most mysterious secrets about the mechanics and working of the universe. That is precisely the objective of the present article, where the Lalitha Sahasranamam the crown jewel of the esoteric tradition of Sri Vidya, which in turn is the pinnacle of the Hindu Advaitic philosophy, is the key focus. In particular, assorted names of the Lalitha Sahasranamam are considered, and by using a combination of decipherments of metaphors, allusions, symbolism, semiotics and etymo-linguistic studies, deeper meanings of each Nama are studied, primarily in context with the Higher Sciences, revealing key details about our universe.

1. Introduction

Hinduism is a religion of nearly a billion people, consisting among its vast repertoire, objects and concepts that a vast number of people in spite of all their varied opinions agree upon as revered, sacred and esoteric - the image of Ganesha found in many homes, the Bhagavad Gita and the Pranava Mantra Om [1-3]. On a similar pedestal would be placed the Shri Chakra, the most intricate geometric pattern found in the vast literature of Hinduism. It is understood by a few, mastered by a handful of blessed souls, but revered by many [4-6].

The Shri Chakra is deemed to be the map of the Universe; the ultimate 'periodic table' of spirituality [6]. There are thus innumerable ways to perceive the Shri Chakra, some of which include Mathematical, Scientific and Spiritual. The Shri Chakra is extolled by various Upanishads and Tantras as being the form of the Divine Mother Herself, who most fondly called Lalitha – She who plays delightfully. Lalitha is the Divine Mother, the source and Creatrix of the entire Universe. Also, She Herself is seen as the universe. She has neither a beginning nor an ending [4-6].

Among the vast ocean of Hindu literature, the Lalitopakhyana, a part of the Brahmanda Purana gives the most detailed account of Mother Lalitha, Her Origin and Her Deeds. Another source is the popular Lalitha Sahasranamam, the 1000 names of the Divine Mother. The following sections expound on a small section of the Lalitha Sahasranamam, in an attempt to uncover the hidden truths and allusions to Higher Science that has been deftly encoded in spiritual metaphorism [7-8].

2. Scope of the Lalitopakhyana

The Lalitopakhyana is presented as a narration of how the Divine Mother Lalitha slays the evil Bhandasura, who is a metaphor for ignorance. It is seen that the only way out of ignorance is willingness to know; in other words, the awareness and consciousness required to know. This fundamental consciousness is seen as the Divine Mother Lalitha. Thus Bhandasura represents the empty void of the universe, in complete darkness and inconceivable inertia. The Divine Mother is the pure consciousness, the powerful information that quells the darkness of ignorance. It is this information that makes up the universe [9-10].

Thanks to quantum field theory, quantum consciousness and information theoretical studies, studies have hypothesized a lot of theories where information is the primary constituent of the universe. According to these theories, it is this information and its dynamics that give rise to various physical properties like mass, charge, spin and so on [9-13].

Thus, the description of Lalitopakhyana in the Lalitha Sahasranama, in essence, contains the theory of the universe. The various aspects of the 'informational universe' and its implications in various disciplines such as Mathematics, Science, Technology, Management, Arts, Humanities and Spirituality can be inferred from this sacred text.

3. Panchakrithi – The Five Actions

The first few Namam denote the Five great actions performed by the Mother, simultaneously alluding to key paradigms in science and management.

- A. **SHRI MATHA**: The Mother. The source of all creation. The Ma in Matha signifies enlightenment whereas the A symbolizes bliss. Enlightenment denotes that the first wave of creation was one of information. The action alluded to is Srishti – Creation.
- B. **SHRI MAHARAJNI**: The Supreme Empress. The only One that has ever been, and the only One that ever will be. This can be taken by extension to categorically dispel off multiverse theories of everything, signifying that our Universe may be the only One [14]. The action here is Sthithi – Preservation.
- C. **SHRIMATH SIMHAASANESHWARI**: The One with a Lion Seat. Lion alludes to might, valour and destruction. The action here is Samhaara – Destruction.
- D. **CHIDAGNI KUNDA SAMBHOOTHA**: The One emergent from the Fire-pit of Consciousness. This clearly demonstrates the equivalence of information (consciousness Chid) and energy (fire Agni). Coupled with Einstein's famous Mass-Energy equivalence, information can be shown to be the basic constituent of all matter and energy in the Universe [15-16]. The action here is Tirodhaana – Compactification.
- E. **DEVAKAARYA SAMUDBHAVA**: The One arising of Divine Act. Mythologically it alludes to the various Gods (Devas) invoking Lalitha. This Nama summarises the key intent of the Universe in a single word – Divine. Divine intent is defined to be the intent that maximizes the welfare of the whole universe. The action here is Anugraha – Grace.

UDYADBHAANU SAHASRAABHA – One with the splendor of a 1000 rising suns. This Nama refers to the radiance of the Divine Mother. Also, it alludes to the fact that during Creation (Udyad), when there was only information, the energy equivalence of that consciousness was extremely high.

This is noteworthy because Particle Physics researches such as the CERN in Geneva conduct experiments in the range of Giga and Tera Electron Volts (GeV-TeV) to detect subatomic particles and confirming theories corresponding to early stages of our universe [17-19].

CHATURBAAHU SAMANVITHA: The Four Armed One. The four arms here clearly refer to the four principal dimensions of the world we live in – three space dimensions (length, breadth and height) and one time dimension. The theory of General Relativity has explored in detail this 4D spacetime construct and has clearly shown that it is these dimensions and the way they interact with matter that are responsible for mass and gravity [15-16].

4. Nonlinearity and Chaos Theory

The next few Namas enumerate the Ayudhaas or Tools in the four hands of the Divine Mother.

RAAGASVAROOPA PAASHAADYA KRODHAANKAARAAKUSHOJJVALA: The One who has the Noose of Desire and the Goad of Hatred.

The first two ‘weapons’ listed are love and hatred. It is well known from psychology that love and hatred arise due to discrimination – we value something either exceptionally higher or lower than others, causing us to love or hate it respectively. Thus, the key element here is discrimination [20].

Mathematically, this discrimination is termed Nonlinearity, and it is easy to see why it is essential [21]. Without discrimination, one would neither have pleasure and pain. Insects and reptiles would be gnawing away at flesh and bones and one would neither feel pain nor know a thing. Without the sharp nonlinearity at 100 degrees Celsius, water would boil just at any temperature, which means that most of our body constituents would be an incoherent mess, without form or structure.

MANOROOPEKSHU KODANDA PANCHATANMAATRA SAAYAKA: The One wielding the Bow of the Mind and the Five Arrows of the Senses.

If the form of the Mother and hence of the Universe is indeed information, then it is imperative to have a receptor. Of what use is information without something to perceive it? This receptor is the most beautiful organ in nature – the mind [9-12].

One might ask an intuitive question: The mind is also a thing in this universe, hence made up of information. How then does information detect information? Here the essential ingredient for information A to perceive information B is complexity. The complex one will perceive the simple one, but not vice versa. Thus the principal characteristic of the mind is complexity of information. Mathematically, this complexity of information is called Chaos [21].

Recent studies of EEG brain waves completely testify to the fact that the dynamics of the mind are indeed chaotic [22-24].

The Five Senses allude to the various forms by which information is perceived by the mind. In other words, it tells us the forms of information, which can be alternatively viewed as the dimensions of information. These higher dimensions of information compactify into various properties like color, texture, charge and mass in our 4D spacetime [15,16].

Higher Dimensions of the Universe

NIJARUNA PRABHAPOORA MAJJAD BRAHMAANDA MANDALA: The Radiant Resplendent One with the Hue of the Rising Sun. This verse is an allusion to the geometry (Mandala) of the Universe (Brahmanda).

The various descriptions of Higher Dimensions in Modern Physics are represented mathematically as groups of operators. There are many such groups such as $U(1)$, $SU(2)$, $SO(2)$, $SU(3)$, D_4 , G_4 and so on. The largest simple exceptional group is the 8 Dimensional E_8 . The structure of E_8 represents an 8D polytope with 248 symmetries. This E_8 appears in the Heterotic String Theory as $E_8 \times E_8$, and the E_8 Theory of Everything is completely centered on the E_8 . This E_8 is often described as the most beautiful and intricate mathematical structure [25-30].

CHAMPAKA ASHOKA PUNNAAGA SAUGANDHIKA LASATKACHA: The One whose Hair is adorned by the four fragrant flowers. The four flowers that adorn Her hair are an allusion to the four families of coordinates in the E_8 model. They are Spatio-Temporal (wS and wT), Electroweak (U and V), Coupling (W) and Color (X, Y and Z). These four groups form the basis for defining each elementary particle uniquely in the E_8 space [29-30].

KURUVINDA MANISHRENI KANAT KOTIRA MANDITHA: One whose Crown is adorned by the rare Kuruvinda Ruby.

In the Kundalini Yoga, Seven Energy centers of the human body are described, each one associated with a particular world view, color and musical note. Of these, Muladhara, the lowest of these is associated with the Red color, and is also the seat of the Kundalini serpent at the fully evolved state. During spiritual progress, this serpent representing Shakti rises, passes through the seven Chakras, reaching its destination at the Crown, the Sahasrara representing Shiva [31].

This concept is alluded to in this Nama where the ruby (denoting the Kundalini serpent from the Muladhara) is present in the Crown Chakra, representing complete spiritual progress and hence Self-Realisation or Moksha.

ASHTAMI CHANDRA VIBRAJA DHALIKA STHALA SHOBITHA: The One whose forehead appears like the eighth day moon. This is again an allusion to the 8 dimensions of the E_8 group. Also, it refers to the chemical tendency of elements to attain stability in the half full and full valency states [29-30].

5. Cosmology:

MUKHACHANDRA KALANKABHA MRUGANAABHI VISHESHAKA: One with the resplendent Kasturi mark. The Kasturi mark is an allusion to the third eye of the Divine Mother. It is mentioned that

the Mother's right and left eyes represent the sun and the moon, whereas Her Third Eye represents Fire. Thus, the Kasturi on the third eye denotes symmetry of the first two, and also denotes the equivalence of Information with Force and Matter [15-16].

VADANASMARA MAANGALYA GRUHA THORANA CHILLIKA: The One whose eyebrows resemble the festoons of Cupid.

This Nama alludes to the nature of information-force-matter described in the previous Nama. Specifically, it says that the eyebrows, which seen from afar look like a continuous line, actually resemble a garland (Thorana). This implies that at the smallest scale of space and time, various parameters of the universe such as energy is discrete. This is verily the postulate of Quantum Mechanics and Quantum Field Theory which has been successfully tested rigorously in the past few decades [32].

VAKTRA LAKSHMI PARIVAHA CHALAN MEENABHA LOCHANA: The One whose Eyes resemble Fish moving Swiftly in a pond.

It is well known that a person's emotions can best be ascertained from their eyes. Similarly, the Mother's Eyes, filled with the emotion of Compassion move swiftly so that She casts Her Grace (Kataaksha) on the entire universe.

More specifically, this Nama alludes to the Activity modes of the information that make up matter (moon) and energy (sun). This information varies with time, and if the E8 theory is assumed, the information consists of 3 Quantum Bits or Qubits. The activity modes of the 3 qubits are defined as the three Gunas of Sattva, Rajas and Tamas [29].

NAVACHAMPAKA PUSHPAABHA NAASADANDA VIRAAJITHA: The One whose nose resembles a new blossom of Champaka.

The nose is an organ of smell, and the Champaka is the source of a fragrance. By equating the both, this Nama alludes to the fact that the Divine Mother represents ultimate Spiritual transcendence where the worshipper, the worship and the Deity all merge into one single entity. This is verily the principle of Advaita.

TAARAKAANTHI TIRASKARI NAASAABHARANA BHAASURAA: The One wearing a nose stud that outshines the stars. This verse is an allusion to cosmology.

The nasal bridge represents a waisted hyperbolic geometry – the deSitter geometry of spacetime with positive curvature. This geometry represents the inflation that occurred in the early universe. Also, the nose stud near the bottom of her nose (end of this inflated stage) represents the various stars, planets and celestial bodies found at the end of inflation. At this stage, the universe consists of three kinds of entities – Ordinary Matter (Non Inflating), Cold Dark Matter (Non Inflating) and Dark Energy (Inflating). While the shape of the nasal bridge alludes to dark energy, Her nostrils and the darkness within alludes to dark matter and the nose stud alludes to ordinary matter, which by size and volume is much smaller than Her nostril (dark matter) [33-37].

6. Energy – Sound and Light

KADAMBA MANJARI KLIPTA KARNAPOORA MONOHARAA: The One whose ears represent Kadamba petals.

This verse is again an allusion to symmetry. The ears represent the right-left chirality, and also control the fluid that maintains symmetry and balance in the body. Thus this Nama represents the importance of chirality and the various symmetries it encompasses, namely CP (conjugation-parity symmetry) and CPT (conjugation-parity-time reversal). It is this chirality, coupled with spacetime that yields gravity and mass[38-40].

TAATANKA YUGALI BHOOTHA TAPANODUPA MANDALAA: One whose ear-rings are the sun and moon.

This Nama denotes the ability of primordial sound energy and hence music to access the higher dimensions and the three activity modes (TriGunas) described by the sun, moon and fire. Hindu literature talks extensively about music. The Sangita Damodara reveals that when Parvathi Devi asked Lord Shiva to give mankind an easy and pleasurable way of attaining self realization, He revealed the secrets and nuances of Music. Also, in the Thevaaram, the first occurring description of Lord Shiva is “Thodudaiya Seviyan”, alluding to His ears and hence Music. To this date, music remains the most powerful form of art enjoyed by everyone, and also having healing benefits with minimal side-effects [41-43].

PADMARAAGA SHILAADARSHA PARIBHAAVI KAPOLABHOOH: Whose cheeks are shining, soft and reflecting.

The Mother’s cheeks are described as rosy red, representing compassion. The Sanskrit word for cheek is Kapola. The Akshara Ka represents Coordination, Pa Independence, O Pleasure and La Beauty. This is a four-lettered summary of evolution in general. Coordination between the various natural resources balancing the ecosystem, Independence of evolution and gaining of a unique identity, Pleasure and Comfort Maximizing Behavior and Beauty of Form are the key highlights of evolutionary progress.

NAVAVIDRUMA BIMBASHREE NYAKKAARI RADANACCHADAA: Red Lips outshining the coral and the Bimba fruit.

The excessive mention of redness of lips alludes to an undue imbalance in the color spectrum. An overly dependence on red implies that the forward-backward time symmetry is broken. Nature exclusively favors matter over antimatter, forward time over reverse time, left handed over right handed chirality and so on [38-40].

SHUDDHA VIDYAANKURAAKAARA DHVIJA PANKTHI DVAYOJVALAA: With the teeth resembling the Shuddha Vidya.

Shuddha Vidya is Sri Vidya. Sri Vidya is the esoteric form of the Mother in the form of sound (Mantra). Specifically the Sri Vidya has two major Mantras, the Shodashakshari with 16 syllables (representing the 16 phases of the moon) and the Maha Shodashi (32 syllables). These 32 syllables represent the 32 teeth of the divine Mother. It is said that these Mantras do not just invoke the Mother, rather these Mantras are the Mother. Also, the hidden nature of Her teeth within her lips indicate that the Mantra is esoteric, extremely potent, sacred and secret [4-6].

KARPOORAVITIKAAAMODHA SAMAAKARSHI DIGANDHARAA: The One who gives fragrance to the Universe like the Karpoora Vitika (Betel-Paan). This is an allusion to the delicious taste or Rasaa. Rasaa also means emotions, and the Mother is denoted as the Akhanda Eka Rasa Roopini – constantly indulged in the one King of Rasaas. Specifically, the delicious juice of the Karpoora Vitika represents the sweetness of Bhakti Rasaa, which pervades the entire universe as love.

NIJA SALLAAPA MAADHURYA VINIRBHARTSITA KACCHAPI: The One whose voice put Saraswathi's Veena to shame.

Saraswathi is the Goddess of music and arts. The verse indicates that the Divine Mother's voice is more mellifluous than the melody of the Veena. Here the Mother's Voice represents Anaahata Naada (Unstruck sound) whereas the Veena represents Aahata Naada (Struck, physical sound). This Naama highlights that, during spiritual progress, we move from the easily accessible Aahata to the more subtle and more esoteric Anaahata, signifying our union with the Divine.

MANDASMITHA PRABHAAPOORA MAJJATKAAMESHA MAANASAA: Attracting Kaameshwara by Her Sweet Smile.

The duality of existence-attributes are viewed as Shiva and Shakti, or in this case, Kameshwara and Kameshwari. Whereas Kameshwara is the Prakaasha, the undivided resplendent Radiance, Kameshwari is the Vimarsha, the One reflecting Kameshwara and creating awareness of the attributes of Kameshwara. Thus, the Mother's smile denotes this awareness. Together, the two in unison represent the dynamics of Kaamakalaa, out of which the Pranava sound Om is born.

ANAAKALITHA SAADHRISHYA CHIBUKA SRI VIRAAJITHAA: With the most beautiful chin.

The Aksharas for Chin contain Cha – Freshness, I – Desire, Ba – Information, U – Care and Ka – Coordination. Together they denote the mechanics of the universe – freshness, coupled with the desire to expand, information filled, cautious and carefully coordinated.

KAMESHA BADDHA MAANGALYA SUTRA SHOBHITHA KANDHARA: Her neck adorned with the Maangalya Sutra of Kamesha.

This Nama again alludes to the Kamesha-Kameshi Prakasha-Vimarsha balance. In addition, among the seven Chakras, the one associated with the throat and neck is Visuddhi. Functionally, it represents articulation and purity. Metaphysically, it represents vibration modes of information. The Mangalya of Kamesha-Kameshi adorning this neck is an allusion to Pranava Om adorning the Visuddhi Chakra. Thus the voice of the Mother (universe) is Om. The principal vibration mode is Om. The purest sound is Om.

7. Conclusion

In the present article, assorted Namas of the Lalitha Sahasranama are explored and by deciphering the metaphors, allusions and etymo-linguistic coding, one obtains deeper meanings pertaining to higher science and deeper understanding of the mechanics of the universe. The Lalitha Sahasranamam is the crown jewel of the Sri Vidhya tradition, which in turn is the pinnacle of Hindu, Vedic and Sanatana Dharmic traditions, which have been time-tested for thousands of years, influencing a nation of more than a billion in literally every aspect of life.

References

- [1] J. E. Berendt, *Nada Brahma, the World is Sound: Music and the Landscape of Consciousness*, Destiny Books, 1987.
- [2] A. Danielou, *While the Gods Play: Shaiva Oracles and Predictions on the Cycles of History and the Destiny of Mankind*, Inner Traditions, 1987.
- [3] D. Frawley, *Mantra Yoga and Primal Sound: Secret of Seed (bija) Mantras*, Lotus Press, 2010.
- [4] D. R. Brooks, *Auspicious Wisdom: The Texts and Traditions of Srividya Sakta Tantrism in South India*, SUNY Press, 1992.
- [5] L. R. Chawdhry, *Secrets of Yantra, Mantra and Tantra*, Sterling Publisher, 2005.
- [6] C. S. R. Sastri, *Srividya Khadgamala*, Sri Balamanorama Press, 1954.
- [7] Chundury, Phani Rama Krishna, and Geetha Viswanathan. "BIO-ASSAY OF CICERARIETINUM (BENGAL GRAM), ACROTYLOMAUNIFLORUM (HORSE GRAM) AND VIGNARADIATA (GREEN GRAM); EXPOSED TO VEDIC CHANTING-LALITHA SAHASRANAMA COMPARED WITH CONTROL." (2015).
- [8] V Ravi, *Lalitha Sahasranamam*, Manblunder, 2010
- [9] Jackendoff, Ray. *Consciousness and the computational mind*. The MIT Press, 1987.
- [10] Tononi, Giulio. "Consciousness, information integration, and the brain." *Progress in brain research* 150 (2005): 109-126.
- [11] Clayton, Philip. "Mind and emergence: From quantum to consciousness." (2004).
- [12] Vitiello, Giuseppe. "Quantum dissipation and information: A route to consciousness modeling." *NeuroQuantology* 1.2 (2007).
- [13] Lloyd, Seth. "5 The computational universe." *Information and the nature of reality: From physics to metaphysics* (2010): 92.
- [14] Carr, Bernard. *Universe or multiverse?*. Cambridge University Press, 2007.
- [15] Lloyd, Seth. "A theory of quantum gravity based on quantum computation." *arXiv preprint quant-ph/0501135* (2005).
- [16] Stachel, John, and Roberto Torretti. "Einstein's first derivation of mass-energy equivalence." *Einstein from "B" to "Z"* 9 (2002): 215.
- [17] Dittmar, Michael, and Herbi Dreiner. "How to find a Higgs boson with a mass between 155 and 180 GeV at the CERN LHC." *Physical Review D* 55.1 (1997): 167.
- [18] Arnison, G., et al. "Experimental observation of lepton pairs of invariant mass around 95 GeV/c² at the CERN SPS collider." *Physics Letters B* 126.5 (1983): 398-410.
- [19] Antoniadis, Ignatios. "A Possible new dimension at a few TeV." *Physics Letters B* 246.3 (1990): 377-384.
- [20] Fitness, Julie, and Garth JO Fletcher. "Love, hate, anger, and jealousy in close relationships: a prototype and cognitive appraisal analysis." *Journal of Personality and Social Psychology* 65.5 (1993): 942.
- [21] Strogatz, Steven H. *Nonlinear dynamics and chaos: with applications to physics, biology, chemistry, and engineering*. Westview press, 2014.
- [22] Jansen, B. H. "Is it and so what? A critical review of EEG chaos." *Measuring chaos in the human brain* (1991): 49-82.
- [23] Pijn, Jan Pieter, et al. "Chaos or noise in EEG signals; dependence on state and brain site." *Electroencephalography and clinical Neurophysiology* 79.5 (1991): 371-381.
- [24] Pritchard, Walter S., and Dennis W. Duke. "Measuring chaos in the brain: a tutorial review of nonlinear dynamical EEG analysis." *International Journal of Neuroscience* 67.1-4 (1992): 31-80.
- [25] Krasnikov, N. V. "On supersymmetry breaking in superstring theories." *Physics Letters B* 193.1 (1987): 37-40.
- [26] Cohen, Arjeh M., and Robert L. Griess Jr. "On finite simple subgroups of the complex Lie group of type E8." *Proc. Symp. Pure Math. Vol. 47. No. 10*. 1987.
- [27] Koca, Mehmet, Ramazan Koc, and Muataz Al-Barwani. "Noncrystallographic Coxeter group H4 in E8." *Journal of Physics A: Mathematical and General* 34.50 (2001): 11201.

- [28] Green, Michael B. "Superstring theory." European Southern Observatory Conference and Workshop Proceedings. Vol. 23. 1986.
- [29] Lisi, A. Garrett. "An exceptionally simple theory of everything." arXiv preprint arXiv:0711.0770 (2007).
- [30] Lisi, A. Garrett. "An explicit embedding of gravity and the Standard Model in E8." Representation Theory and Mathematical Physics, Contemp. Math 557 (2011): 231-244.
- [31] Gopi, Krishna. Kundalini: The evolutionary energy in man. Shambhala, 1997.
- [32] Feynman, Richard Phillips, and Albert R. Hibbs. Quantum mechanics and path integrals. Vol. 2. New York: McGraw-Hill, 1965.
- [33] De Sitter, Willem. "Einstein's theory of gravitation and its astronomical consequences. Third paper." Monthly Notices of the Royal Astronomical Society 78 (1917): 3-28.
- [34] Witten, Edward. "Anti de Sitter space and holography." arXiv preprint hep-th/9802150 (1998).
- [35] De Sitter, Willem. "On the relativity of inertia. Remarks concerning Einstein's latest hypothesis." Proc. Kkl. Akad. Amsterdam 19 (1917): 1217-1225.
- [36] Clowe, Douglas, et al. "A direct empirical proof of the existence of dark matter." The Astrophysical Journal Letters 648.2 (2006): L109.
- [37] Copeland, Edmund J., Mohammad Sami, and Shinji Tsujikawa. "Dynamics of dark energy." International Journal of Modern Physics D 15.11 (2006): 1753-1935.
- [38] Babu, K. S., Bhaskar Dutta, and Rabindra N. Mohapatra. "Solving the strong CP and the supersymmetry phase problems with parity symmetry." Physical Review D 65.1 (2001): 016005.
- [39] Senjanovic, Gt, and Rabindra N. Mohapatra. "Exact left-right symmetry and spontaneous violation of parity." Physical Review D 12.5 (1975): 1502.
- [40] Mohapatra, Rabindra N., and Jogesh C. Pati. "Left-right gauge symmetry and an " isoconjugate" model of CP violation." Physical Review D 11.3 (1975): 566.
- [41] Davis, William B., Kate E. Gfeller, and Michael H. Thaut. An introduction to music therapy: Theory and practice. American Music Therapy Association. 8455 Colesville Road Suite 1000, Silver Spring, MD 20910, 2008.
- [42] Bruscia, Kenneth E. Defining music therapy. Barcelona Publishers, 1998.
- [43] Stige, Brynjulf. Culture-centered music therapy. Barcelona Pub, 2002.