Welcome to the Presentation

Science, Spirituality, Shri Yantra
Modern Science

- Quantum theory deals with the small scale world of atoms and particles.

- The theory of relativity covers the large-scale structure of the universe.

- Scientists are searching for a complete and consistent theory that unifies quantum and relativity theories.
Quantum theory

- In 1900, Max Planck published his theory explaining the emission spectrum of black bodies (Quantum theory). Plural of quantum is quanta.
- In Physics, Quantum refers to an indivisible and elementary entity known as Planck constant for measurement of length and time.
- The Planck length is $10^{-36}$ meters. (That is one meter divided by one followed by 36 zeros!)
- The Planck time is $10^{-43}$ seconds. (That is one second divided by one followed by 43 zeros!)
Need for a cosmic factor

Albert Einstein, after his theory of special relativity (1905) and theory of general relativity (1915), intuitively felt the need for cosmic factor and incorporated it in his theory as cosmological constant. Later, he abandoned it due to its incompatibility with physics.

“Results found in 2000, however, revealed that Einstein was probably right after all: the cosmological constant not only exists, but dark energy probably makes up the largest source of matter/energy in the entire universe.”

(From: Einstein’s cosmos (2004) by Michel Kaku)
Before the Big Bang

**Singularity**: A point at which the space-time curvature becomes infinite.

The picture here shows evolution of the universe from the point of singularity.
After the Big Bang

Elements that emerged after the Big Bang are:

- space
- time
- Gravity
- strong force
- weak force
- electromagnetic force
- elementary particles
- code/information
Elementary particles

- Yellow: electrons
- Red: protons
- Green: neutrons

At quantum level, the particles behave as waves also.
Space

Scales of space measurement.
If human scale of measurement is one meter, the size of atom will be one meter divided by one followed by 18 zeros and the size of galaxy will be one meter multiplied by one followed by 18 zeros.
Time

Time is currently defined via measurement. One second is 9,192,631,770 oscillations of a hyperfine transition in the 133Cs atom.

Light year is the distance covered by light in one year travelling at the speed of 300 000 kilometers per second.
Space-time

Einstein linked space and time into space-time continuum.

In this picture, earth is depicted in two spatial dimensions X and Y (the plane of the earth orbit) and a time dimension.
Gravity

Newton discovered gravity and his law of universal gravitation states that every object in the Universe attracts every other object with a force directed along the line of centers of mass for the two objects.
Gravity on Earth

Gravity on earth is different from other bodies in the solar system. If the gravity on earth is one, it will be 27.9 on the sun, 0.16 on the moon, 2.64 on Jupiter and 0.06 on Pluto.
Three nuclear forces

• Strong nuclear force tightly holds the protons together in the nucleus of an atom.

• Weak nuclear force is responsible for the decay or radioactivity of some sub-atomic particles.

• Electromagnetism is the force that acts between electrically charged particles.
Symmetry after the Big Bang

This is symmetry immediately after the Big Bang. It broke when temperature of the universe lowered and a number of completely different particles at low energies emerged. Similar symmetry will appear at the end of the universe or just before the Big Crunch.
Nucleus and the field of an atom

An atom may be visualized as a ball shaped soccer field of several kilometers diameter with the players and the referees of the size of wasps in the center (as nucleus) and balls of the size of mosquitoes moving in the field as electrons!
Galaxies formed in the universe

This is a view of the cluster of galaxies that may be called observable or visible universe. The total number of galaxies and clusters of galaxies is not known.
Our galaxy - The Milky Way

The Milky Way is a large disk-shaped spiral galaxy about 100,000 light years in diameter and 3,000 light years in thickness. It is estimated that the Milky Way contains about $3 \times 10^{11}$ (300 billion) stars and the sun is just one of them.
Molecule

Generally, a molecule is the smallest particle of a pure chemical substance that still retains its composition and chemical properties. A molecule is a sufficiently stable, electrically neutral entity composed of two or more atoms.

Water molecule

H₂O is an oxygen atom (red) bond or connected with two hydrogen atoms (blue) to make a molecule we call water molecule.
**Covalent bond of atoms**

A covalent bond is formed when the electron clouds of two atoms overlap. Where the clouds overlap they are thicker, and their electric charge is stronger. A group of atoms joined in this way is known as a molecule. The number of covalent bonds which an atom can form depends on how many electrons it has.
The states of gross matter

Here are pictures of water molecules in three forms:

- Gas
- Liquid
- Solid

Most liquids contract (get smaller) when they get colder. Water is different and contracts until it reaches 4°C when it expands until it is solid. This property is important for preservation of life under very low temperatures.
Supernova

When the star cools and its energy is reduced, it explodes and throws away some atoms that combine to make molecules. The picture here shows supernova like explosion.
Earth emerged as a ball of fire after supernova like explosion of the sun. Gradually, it cooled and had the proper climate, water and fertile ground for life to survive and prosper.
The universe as one field...

The Field of quantum or Zero Point Field is all pervading and makes the universe as one field. The empty space (consciousness and gravity) in the field of atom is vast compared to the size of particles.

E=electron; N=neutron; P=proton
Wave/particle duality

• The quantum theory has shown wave/particle duality of reality at sub-atomic level

• This confirms the relevance of waves or non-material phenomenon in understanding the reality.
What is spirituality?

- Understanding the Unity of the Cosmos/Universe from micro to macro level as one field.
- Belief in the Supreme Power (God, Goddess, Cosmic Consciousness etc.) as the first cause having Wisdom to create and regulate everything.
- Acceptance of the reality of consciousness as well as energy and gravity.
**Duality and consciousness**

- In the quantum field theory, energy/matter is enveloped by gravity and consciousness.
- The non-manifest consciousness in the field is as real as the manifest energy/matter.
- The manifest energy/matter and the non-manifest consciousness create the dual reality of the universe.
- Energy/matter is known through experiment and consciousness is known through experience.
- The domain of science is energy/matter and the domain of spirituality is consciousness.
Different forms of duality

- Particle and field.
- Manifest and non-manifest.
- Physical and metaphysical.
- Quanta and qualia.
- Energy and consciousness.
- Objects and observer.
- Body and mind.
- Matter and spirit.
- Experiment and experience.
Consciousness, code and mind

- Quantum theory implies connectivity of energy/matter and consciousness in the field.
- Energy is transferred through waves whose features become the code.
- Human brain is able to measure the features of the waves and interpret the code.
- Consciousness creates awareness of the process in the brain.
- Awareness of the process in the brain is known as mind.
What is consciousness?

By “consciousness” I simply mean those subjective states of sentience or awareness that begin when one awakes in the morning from a dreamless sleep and continues throughout the day until one goes to sleep at night or falls into a coma, or dies, or otherwise becomes, as one would say, “unconscious”. (John, R. Searle).
Consciousness and qualia

Some thinkers believe that qualia are the micro form of consciousness just as quanta are the micro form of energy. According to Philosopher Daniel Dennett, qualia are:

1. ineffable (they cannot be communicated);
2. intrinsic (non-relational properties);
3. private (interpersonal comparisons of qualia are impossible); and
4. directly or immediately apprehensible in consciousness.

(From Wikipedia)
Life and Consciousness

- Life, as we know, is presently only on the earth.
- It is through life and consciousness that human beings have attained the capability to creativity and self awareness.
- This view is supported by Robert Lanza in his book “Biocentrism: How Life and Consciousness are the Keys to Understanding the True Nature of the Universe”.
Evolution of human brain

The size of brain has evolved on earth through gradual process. The picture here shows that process from fish brain to human brain.
Three parts of human brain

Human skull holds not one but three brains. These three brains, as shown in the picture, are:

- the neo-mammalian brain (dark grey).
- the limbic brain (light grey).
- the reptilian brain (red).
Functions of human brain

1. Physical maintenance of body.
2. Intelligent learning.
3. Memory management.
4. Creativity.
5. Awareness.
6. Dream experience
7. Intentionality.
8. Language learning
9. Sense perceptions.
10. Experience of emotions.
Consciousness-mind-brain

Both consciousness and brain are essential for mind, a process that takes place in the brain through the impact of consciousness. This process is depicted here in a simple diagram.
Consciousness and neurons

Some scientists say that **Neurons** are the basic information processing structures in the brain and a million billion synaptic connections through which "information" flows cause consciousness.
Consciousness and microtubules

According to another theory, the cores of microtubules inside neurons of the brain perform the quantum-scale information processing and create conscious awareness. Roger Penrose and Stuart Hameroff are the authors of this theory.
Colors exist only in our consciousness. In the physical world, they are colorless electro-magnetic waves. When some of these waves enter our brain through the eyes, they are perceived in the mind as colors.
Types of human consciousness

1. Life consciousness,
2. Sense consciousness,
3. Self consciousness,
4. Language consciousness,
5. Rational consciousness,
6. Social consciousness,
7. Dream consciousness,
8. Creative consciousness,
9. Cosmic consciousness.
Cosmic consciousness

“The basic fact of Cosmic consciousness, implied by its name, is the consciousness of the cosmos as a living presence. It involves the immediate perception of the immortality of one's soul.”

Richard Maurice Bucke
“Cosmic Consciousness”, 1901
Physics and consciousness

“...a physical ‘theory of everything' should at least contain the seeds of an explanation of the phenomenon of consciousness... It must be of such sophistication that the brain is enabled to dig more deeply into the fundamental workings of the Universe than are more commonplace physical systems.”

Roger Penrose in an article in Nature (January 2005).
**Spiritual Machines**

- The "**Age of Spiritual Machines**" is a book by Ray Kurzweil relating to the development of technology and its impact on human beings.
- The book predicts that eventually humanity and its machinery will become on.
- It is, however, unlikely that the machines will ever have consciousness and become spiritual.
Science and spirituality

“What matters is that in the interacting development of these two basic trends upon which Mankind is continuing to build itself, technical organization and the growth of reflective consciousness, the second should acquire an ever greater predominance and degree of autonomy.” -- Teilhard de Chardin, The Future of Man.

Science + spirituality = Wisdom
Shri Yantra

Yantra or mandala is a powerful tool for many people to get in contact with their inner and outer realities.

Shri Yantra or the Mandala of Wisdom is considered to be the abode of the Goddess of Wisdom or Supreme Knowledge (Shri Vidya).
Shri Yantra design in lines

The inner part of Shri Yantra has four triangles with apexes up and five triangles with apexes down. The bindu or point is located in the center. Two lotus circles, one of eight petals and another of sixteen, three rings and a line with 36 right angles are the outer parts of the Yantra.
The four triangles with apexes upwards (consciousness or Shiva) and the five triangles with apexes downwards (energy or Shakti) are shown here separately.
Hexagons in the inner circles

Intersection of lines of the nine triangles are called Chakras (circles). However, they appear as hexagons. The number of blue and pink areas is 89.
Hexagons converted into circles

The total number of blue and pink areas remains 89 (43 blue and 46 pink). The pink areas represent the energy aspect and the blue areas represent the consciousness aspect of reality.
Circular view of Shri Yantra

The nine circular areas of Shri Yantra are:
1. Bhupur or earth.
2. Three circles.
3. Circle of sixteen lights.
4. Circle of eight petals.
5. Fourteen triangles.
6. Ten outer triangles.
7. Ten inner triangles.
8. Eight triangles.
9. Bindu (Point) and triangle.
Envelope model of Shri Yantra

In this model, the Chakras represent nine consciousness and gravity envelopes (CAGE) as follows:

Chakra-1. Quantum envelope.
Chakra-2. Particle envelope.
Chakra-3. Atom envelope.
Chakra-4. Molecule envelope.
Chakra-5. Matter envelope.
Chakra-6. Air envelope.
Chakra-7. Fire envelope.
Chakra-8. Water envelope.
Chakra-9. Earth envelope.
Chakra- 1

Spiritual symbolism:
1. Shiva or the Cosmic consciousness;
2. Para Shakti or the Cosmic energy;
3. Iccha Shakti or the energy for creative desire;
4. Gyaan Shakti or the energy for knowledge;
5. Kriya Shakti or the energy for action.

Scientific symbolism:
1. consciousness
2. gravity
3. strong force
4. weak force
5. electromagnetic force
Chakra-2

Elements after the Big Bang:
1. elementary particles
2. space
3. time
4. gravity
5. strong force
6. weak force
7. electromagnetic force
8. code/information
9. consciousness
The third Chakra of Shri Yantra has ten energy areas. The two additional areas in this Chakra are the symbols of:

- Nucleus of the atom, and
- Field of the atom
Chakra-4

The fourth Chakra of Shri Yantra also has ten energy areas. Several atoms join to make molecule and there is no additional physical element.
Chakra-5

The fifth Chakra of Shri Yantra has fourteen areas. The additional four areas represent air, fire, water and earth in inorganic matter or life, senses, intellect and creativity in organic matter in potential state.
Chakra-6

The sixth Chakra of Shri Yantra is the symbol of air.
Chakra-7

The seventh Chakra of Shri Yantra is the symbol of fire.
Chakra-8

The eighth Chakra of Shri Yantra is the symbol of water.
The ninth Chakra of Shri Yantra is the symbol of earth.
Shri Yantra and the human body

Chakra-1 = The solid parts of the body.
Chakra-2 = Liquid parts of the body.
Chakra-3 = Heat/fire in the body.
Chakra-4 = Air/prana in the body.
Chakra-5 = Nadis/nerves.
Chakra-6 = Senses.
Chakra-7 = Mind-brain.
Chakra-8 = Intellect.
Chakra-9 = Self.
Yantra and Evolution of consciousness

Chakra-1 Life consciousness.
Chakra-2 Sense consciousness.
Chakra-3 Self consciousness.
Chakra-4 Language consciousness.
Chakra-5 Rational consciousness.
Chakra-6 Social consciousness.
Chakra-7 Dream consciousness.
Chakra-8 Creative consciousness.
Chakra-9 Cosmic consciousness.
Shri Yantra and body chakras

1. Mulaadhaar Chakra (spine base)
2. Svaadhisthan Chakra (genitals)
3. Manipur Chakra (naval)
4. Anahat Chakra (heart)
5. Vishuddhi Chakra (throat)
6. Talu Chakra (palate)
7. Agni Chakra (eyes)
8. Sahasraar Chakra (brain)
9. Vyom Chakra (space)
Yantra and the Alphabet

All writing symbols could be arranged in 89 areas of the five inner chakras of Shri Yantra. This can be used to promote literacy in nine easy steps.
Shri Yantra Puja

In Shri Yantra Puja (worship) the cosmic or divine energies are invoked to purify oneself.
Chakra-1: Purify the earth element.
Chakra-2: Purify the water element.
Chakra-3: Purify the fire element.
Chakra-4: Purify the air element.
Chakra-5: Purify the nerves.
Chakra-6: Purify the senses.
Chakra-7: Purify the mind-brain.
Chakra-8: Purify the intellect.
Chakra-9: Purify the self.
The solar system as Chakras


Pluto does not fit in the Yantra symbolism. That supports the current view that it is not a planet!

Science, spirituality and Shri Yantra
**Shri Yantra and the solar system**

In this picture, in the center is the Sun. Other planets are (clockwise) Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. These Chakras are like orbs that are sometimes seen in the sky.
This presentation has highlighted the following:

• There is need for recognizing the existence of Cosmic and creative Wisdom at all levels.
• Particle-wave duality is evident at all levels in the universe.
• Energy or matter is not isolated from gravity and consciousness.
• Relationship between energy, gravity and consciousness is precisely regulated to facilitate human life and creativity.
• Information among different parts of universe is passed through wisdom based code.

...Contd
• Human brain can interpret the code through the process of interaction with consciousness. This process is called mind.
• Through consciousness and mind-brain, human beings can experience awareness of different types.
• Shri Yantra or the Mandala of Wisdom depicts several aspects of manifest (energy) and non-manifest (consciousness) reality.
• Shri Yantra can help in understanding energy or matter and consciousness in many ways.

The End