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ळॅंन्यप्तरु'बेन्यप्नरुक्'या

इ'वैन'न्न'न्नक्स'्रुया

वर्चशःर्कूटश श्रदःरूग

ह्यै'स्र' २०१८ ह्यं १० छेस ६ नस ६ नम्



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भेष्ठभाग्राच्यायाद्धवाच्छे स्याक्षेत्राच्याविद्याक्षेत्राच्याविद्याविद्यात्राक्षेत्राच्याविद्यात्राक्षेत्राच्यात्राक्षेत्राच्यात्राक्षेत्राच्यात्राक्षेत्राच्यात्राक्षेत्राच्यात्राक्षेत्राच्यात्राक्षेत्राच्यात्राक्षेत्राच्यात्राक्षेत्राच्यात्राक्षेत्राच्यात्राक्षेत्राच्यात्राक्षेत्राच्यात्राक्षेत्राच्यात्र

यम् मिट्ट वर्ष्ट्र प्रमास्त्र प्रमास्त्र प्रमास्त्र प्रमास्त्र मिल्ला मिट्ट प्रमास्त्र प्रमास्त्र

नभू भी न भू न

प्रहेना हेन प्रथम हो देना मान्य निरम्भ स्तर भी अपन्य देशी नाम हो हो स्वरम मन्त्र परि नहें निर्मान न्ध्राविन-५८: महर्मा ह्वेस विसाय स्टे हे स्टा सदी स्रावस ५ न न न महर्म हे स्वा सदी ५ न न न ৾ৡ৾৾**৻**৽ঢ়ৠয়৽ঽ৾৾ৼ৽৾য়য়য়৽ঽ৾৾য়৽য়ৢ৾৽ঽয়ৼ৽ৼৼ৽ড়৾য়৽ঽ৾ঀ৽ঀ৾৽ৼয়ৢয়৽য়ড়য়৽ঀয়৾৽য়ঢ়য়৽য়ৢয়৽য়ৢয়৽ क्षन्-दश्चेन्यायाः स्वीत्वर्ते : क्षेत्रः स्वीत् क्षेत्रः स्वीत् स्वीतः स्वीतः स्वीतः स्वीतः स्वीतः स्वीतः स्व र्वे. ४०११ व्यून्यम् स्राप्तानामा स्राप्तानामा स्राप्तानामा स्राप्तानामा स्राप्तानामा स्राप्तानामा स्राप्तानामा ब्रेट बेट अप्टर में की ब्रेन लुक लेट। यर्नेट अप्युत्त अर्मे द के द में अर्केन द अप्टर देहें र नवर स्त्री १०१३ स्रूर मुन्नर चिर स्नुनिया हेन इ. र्वर यानवया शुनाहवर निवे चुया पर्वे र्श्वेर-नडंब-न्ने अर्हेन् वर-नु-ने अर्हेन् वर-ह्ना अन्तर-विकायि स्वीति विकायि । बेरअ'जिहेअ'स'र्जे भ्रेज'(बुअ'स'र्नर) हे'सबेब' २०१८ वॅर'क्षर'अर'सरहरासासहर दशैना-५८:नरे-भ्री-१डेश-धरे-नर्हे-१नवि-र्जेना-नर्शे क्षेट्र-भेट्श-नश्रुया-धर्मि-श्रीना-वृश-र्षेट्र २००५ कु:नर-व्रॅं:ब्रेंनश्रह्मःर्जेल:ब्रेट:दर्नेदर्:क्टर्:ह्ल:प्टेंश्रावस्रशःरेनाःवर्रःश्रृंदर्यः क्षेत्र-हेश्य-प्रवेश्वर्हेत्-पाद्धेवेर्षेया-वर्शे क्षेत्र-हेत्श-पद्धेन-पर्वे क्षेत्र-हु-नार-बुर-र्बे नाथ-शु-नाहत्र-नाहि-बुर्य-पादे-नाद्य-या-द्याय-भूष-र्य-क्षेत्र-र्य-क्षेत्र-र्य-क्षेत्र-र्य-क्षेत्र-र श्रूदशःदद्देतःन्दःवर्र्द्रशःवश्चूरःवेशःयदेःवर्द्द्रन्वविदेर्वेवाःवर्त्तेःक्षेत्रःवेदशःवःवर्तेःश्चेवाःवुशा दे निबेदः २०१७ वॅर:कुः वरः हः रसः सः सदे हे पर्वसः सुः वदसः सदे हें र क्वेट वेट क्वेट हो है वा याब्रान्य हे अप्तरे महित्य हो निया निया मिले अपूर्वी हे अप्तरे महें न्याबेर हें मान हों ब्रेट बेट अर्जुन म ने क्षेत्र (त्याम स्थाप अर्थ क्षेत्र में क्षेत्र में क्षेत्र में क्षेत्र में क्षेत्र में क्षेत्र स्थाप क्षेत्र में क्षे यदे-क्रॅ·इ·अ·र्वेद-क्रि:र्ने-अर्देद-विर-दरः। इस्र-क्रुय-र्वेद-क्रि:पेश-देवाःहस्राध्यावीयावरः विहेशः बुदःवर्ज्ञवान्त्रीःर्वेनात्रवान्त्र्यान्त्रोत्त्रोदःवेदवान्त्रान्त्रान्त्रान्त्रान्त्रान्त्रान्त्रान्त्रान्त्र र्ने भ्रिन मुन पर अन्देर नहर नहि नुश पदे हिंत तेश रोय हिंत मेनश ह दर। अन्मर दर য়৾वेॱबेनसः इ। इसः मुल 'सॅन्'ग्रें 'भेस 'सेना 'इससः बिन 'मर-'नडसः दसः 'सॅनसः 'न्हलः सुना र्रेन्यशः न्वरः पॅर्ना १९८६ वॅरः ^२ वॅरः अ^२श्नुनशः सर्वे दः क्वेदः सर्केना दशः र्वेरः ग्रेः र्रवेदः श्रेः ळॅंशनेटन्त्राळ्त्रनेतार्श्वेनात्रहेनान्त्रेमान्त्रीयान्तरेनात्रात्रीयात्रस्त्रीयात्रसार्श्वेत्रस्यवसार्यान्ता नेप्पटा सबर कें भारत्व नाहे भारती सबर खुना नावर दें दानाना नी बर नगरा कें नगरा मा खेर खेर ही न क्चर-दक्षेत्राश्वर-विवारेत्। वर्जे क्चेर-वीर्रक्ष-वादि द्वार्पाय्य विवार देवारी व्यवस्थान विया धिवा

*প্*র'মন'ৡন'য়'৸য়|



ฐารัฐ ฮัสสาสาสิรสารราวัฐ (ฮฺาฮัรา ๑๐:๑๐ สสา ๑๑:๑๐)

न्रस्य ह्वि न्यम न्यस्य

শ্রুর্ ঐবর্ধ বির্বাধার বির্বাহ

বর্ষান্ত্রনাবার্ষার্ক্তরের বিশ্বরার্ক্তরার বিশ্বরার্ক্তরার বিশ্বরার বিশ্বরার বিশ্বরার বিশ্বরার বিশ্বরার বিল্প বিশ্বরার বিশ্বর বিশ্বরার বিশ্বর বিশ

बेर्ट.में। कें.प्रवा

र्तिसंभित्रंश्चरंश्चरः ४५ रना द्वैत्यंद्वैसंस्वयंक्चेत्रंश्चरः ४५)

विव_'नुद'न्भेंत्य'ळीन्स्।

क्षेत्र'क्कुन। ऋँनस'ने नस'ने सुअ'न। र्तः १५ वस' १:६५)

बन'सदे'त्वन'अबन'विश्व'त्वी'इअ'नवन'द**ें**न'छुंया

न्गे नि भेश वयश स्वाय हें हों श

र्तिसंभिन्त्रं से निर्मा देशमा देशमा है स्वरं से स्वरं के निर्मे संस्था से हो

পূস'শ'ৰীশ'শ্বৰ'নী'ন্দ্ৰশ'ন্প্ৰন্

षादिया षात्रवाशर्त्रे थे।

सर्थर्था व्याच्या स्ट्रांच्या क्रिंच स्ट्रांच्या स्वाच्या स्वच्या स्वच

^{हे}ब.र्ट.जू ^{ছ্র.} ३० क्र्य. ब

र्भिराया १५ ८८। इ.म.इयाययाक्टर्सराया १०)

न्रस्य इदि विराम्ब

वैव्युज्ञन। स्मन्यानेनसम्नविष्मा (५:१५ वसः ५:१०)

बवबाविषास्याम्यास्यान्यान्त्रा श्रीत्यंत्रास्या

र्तुस'सुन'ङ्गराया ५५रे

नवो त्रुव र्श्वेन र्श्वेन राष्ट्र सर्टे र्श्वेन वाह्य नवि । विश्व राष्ट्र स्थित विश्वे

तुर'ज़ज़'सवे'द्रे'न'द्रेस'सन्। तु'षन्।ॐनस'बेदस्।

रिश्चमा १०)



निर्देश्मित्राचा बिद्धांत्राचे। क्रिंतेना

इअ'लेब'न्न'। लेब'न्न। इन्यति। जन्यति। ज्ञान्यत्राम्यत्यानिकास्यान्यः स्वानीत्राम्यः स्वानीत्रः स्वानीत्राम्यः स्वानीत्राम्यः स्वानीत्राम्यः स्वानीत्राम्यः स्वानीत्राम्यः स्वानीत्राम्यः स्वानीत्राम्यः स्वानीत्राम्यः स्वानीत्रः स्वानी

समिवःम्.क्ष्र्भःरेचरः।

बद्दान्ते सुँका दका चुनाना त्यका स्टान्य प्रीका चुनाना नोहेना गुन्त से नाहेना स्वाप्त प्राप्त स्वाप्त चुना सम्बद्ध स्वाप्त स्वापत स्वाप्त स्व

भिराया १५ प्रा दे नादेशायदाके नाभूराया १५)

*ॠ*ॱॿऀॸॱਸ਼ॱॖॢॸॱॸॸऀॱॺॕ॒ड़ॱॸॖॱख़॑ॸॱॸॖॺॱॹॖऀॱॸॸॆज़ॱॸ॓ड़ॱॴड़ॺॱॺॴ

ल.प्रेया ल.प्रय.ध.श्रॅ.श्री

हेव पहिषाया ह्या १० केंबा पा

तुभः सुः द्वीर-भीवाः वीश्वः सूर-द्वीः वादशः ययः यः यद्वीर-यः वार्हेरः द्वयः यश। धरः दः सूः वीयः सः द्वीर-यर-दिर्-ह्वाःवाः यरेदः हिंदः सेर्-यः धीदः दस्य।

भिराया ४०)

न्रस्यःह्दैःनरःन्रस्रः।

শ্রংস্থা ঐনধার নমান জিমান। বিগঃসত ক্রমা গ:০০

ळन्द्रुत्यःअप्यन्।नी'ळेन्प्यह्यप्नान्यः। श्रेष्ययःन्तःष्यःयःनृवेष्नवस्यना

ष्म.मे.ला वय.प्र.मु.मी

र्भिराया १५८८: दे.च.देशायवाळेटा भ्रमाया १०)

र्श्वेन में तर्ने प्रत्न मार्के या महारामित हिम्म स्था १०)

বিব'ন্র'ন'র্ম্ম'ঞ্জন্মা

वैव्यक्तमा स्मित्राचे दसान्युअपमा (१:१५ वृद्धाः १:६५)

ळ'न'ह्य'न्द्रेंस'वयस'वन'ळेन'वद्य'ग्री'नगव'नय|

ष्यःलेबा हरःज्या

्रिम् स्य १६ दिन्। हुन् हुमायदाक्ष्म स्याप्त स्थान्य स्थान्य १८ दिन् हुन् स्थान्य स्यान्य स्थान्य स्थान्य स्थान्य स्थान्य स्थान्य स्थान्य स्थान्य स्य

हेव पहिषाया ह्या १० ळेंबा पा

ख़ऺॸॱॸॖॖॖॖॣॖय़ॱढ़॓ॱॿॿॺॱऄॿॱॸढ़ऀॱॿॿॸॱॸॕॿॱॻॖऀॱड़ॖॸॱॸऀॹॹॸॕॸॱॸॺॢॺऻ

र्दे.सर.प्री स.स्र.सरी

(श्रीमास ४५ मा दे ना दे ना दे साम के ना श्री मा ४५)

न्रस्य द्वि न्य न्य स्व

वैव'कुन| ळॅॅनस'बेनस'नवे'स| (५:७५ वस' ५:७०)

र्श्चेन में त्र ने प्य त्र न स्था है स्थित महिया न मित्र स्थित है से स्था १०)

तुर्राक्षत्रास्त्रे 'द्रीपाद्रीयायवा तुर्विना'ॐनयावेदया (क्षराया १०) শ্রুর্ ঐন্ধ্রের্থন্র (१०:०० বর্ষ ११:००)

ন্স্ত্র্র্র্রা অ'ব্রা অ'ব্রার্র্র্র্র্র

নইৰ্'ন'ৰ্'ৰ্'ৰ্

र्मे.यर्जेशःसैमःहूरी

यहिनश्चास्त्राची स्वास्त्राची स्वास्त्राची

भिर.श ८०)

अवअ'वृत्रक्ष'र्त्रेक'र्केक'वेदक्ष'ववि'या सुक्ष'र्देक'क'र्के'वित्र'र्वेद

श्चिम'या १०)

न्रेंद्रप्ट्दिप्टर्ग्यक्रेट्रप्

इंद्री ळॅनसम्बेदसम्बेसम्। रिगः १० वस गः००रे

ळ'न्'ह्य'लुन्द्र'नेन'ने'पन्रेय'ळुंया

षा.लवी प्रम.चेंबा

भिर.मा ४०)

ক্লু'বর্শ'ব্ব'ই্ল'ক্লু'বিশ'্র্র্ণা

र्दे.सर.प्री स.श्रु.सर्

द्या चर्या चर्या क्षेत्र क्ष्या द्या क्षेत्र प्रमा क्षेत्र प्रमा क्षेत्र क्ष्या क्ष्या चर्या क्ष्या क्ष्या क्ष क्ष्या व्या प्रमा क्षेत्र प्रमा क्ष्या क्ष्य

हेव'गशुअ'या ह्य' १० ळेंब' ५

द्यश्राभी चीया हुं या में या खेला भूर मिरा के प्राप्त मा स्वार्थ के स्वरास्त्र में स्वर्ध में स्वर्ध में स्वर् व स्वर्ध से प्रत्या में प्रत्या स्वर्ध में स्वर्ध मे

भिर.श ४०)

अवअ'वृत्रक्ष'र्मेक्ष'र्मेक्ष'वेदक्ष'व्या छन्'ह्त्य'त्रुत्रक्ष'रेत्र'त्रे विद्रोत्य'ह्युत्रा

श्चिमाया ५०)

क्षेत्र'न्**र**भ्य'क्षेत्रभा

উব'ক্কুন| ঐন্ধ'নিম'ন্মুঅ'ন| (৭:০৭ বৃষ' শ:৫৭ ন**ন**|)

अव्अ'वृत्रक्ष'त्र्रेक्ष'ञ्चेत्रक्ष'त्रुत्र्याचा नृत्रेक्ष'त्रअक्ष'नेत्रा'वाद्या वृत्त्यत्रेः इ'न्रेंव'न्न'नन्वविष्

क्षित्राचा तत्री

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Observation and Reality

Cosmology and Consciousness VII

October 4th to 6th, 2018 Gangtok, Sikkim

Introduction

This conference, a 3-day cross-cultural exchange, brings together internationally based scientists in dialogue with 30 Buddhist monastic scholars. Foundational questions in quantum mechanics, have strong resonance in debates found between different Buddhist philosophical schools. How does the experimental evidence of modern physics intersect with Buddhist conceptions of causations, the observer, and how does the act of observation influence our measurements in nature? The monastics, and scientist alike, both steward traditions that strongly encourages dialogue and the open exchange of ideas.

The conference is connected to a 4-week workshop that trained 30 monastic scholars in a first time introductory science course. The course took place before the conference, from September 3rd to 28th. The monastics represent several different Buddhist traditions and monasteries within Sikkim and will participate in the conference panel discussions, and questions and answers sessions.

About the Conference Series:

"Cosmology and Consciousness VII - Observation and Reality" is the seventh conference in a series that convenes Buddhist scholars, and Western and Indian scientists in a 3-day dialogue to promote the integration of spiritual values and scientific investigations. The first conference, "Cosmology and Consciousness - a Dialogue between Buddhist Scholars and Scientists on Mind and Matter" was held in Dharamsala, in December, 2011, and was inaugurated by His Holiness the Dalai Lama. Our second conference on "Knowing and Action" was held at the Songtsen Library in Dehradun in 2013, our third conference on "Harmony and Happiness" was held in Dharamsala in 2014, our fourth "Quantum Mechanics and Emptiness" was held at Namdroling Monastery in Bylakuppe in 2015, our fifth conference on "Regulating & Transforming Emotions" was held at Sherabling Monastery in 2016, and our sixth conference on "Compassion, Virtue and Character" was held at Norbulingka Institute in 2017.

This year, our conference is organized by the Library of Tibetan Works and Archives (in Dharamsala, India) and the Namgyal Institute for Tibetology, and made possible from a grant from the John Templeton Foundation (Philadelphia, USA) and the ongoing generous support of the Sager Family Foundation (Boston, USA). In 1999, His Holiness the 14th Dalai Lama provided a vision and directive for the exiled Tibetan monastic community in India to engage science, and to initiate science trainings that would eventually support new learning at the frontiers of science and Buddhism. This conference series seeks to build upon this inspiration. Form is empty. Emptiness is form. Emptiness is not other than form and form is not other than emptiness. Similarly, feelings, discriminations, compositional factors, and consciousness are also empty.

– from the Heart Sutra



DAY 1- OCT 4TH

Morning - Session 1 (10:00 am to 11:30 am)

Lighting of Butter Lamp and Chanting by venerable monks.

Welcome address by Mr. Tashi Densapa, Director, NIT

Keynote Address by Geshe Lhakdor, Director, LTWA

Address by Honorable Governor, President, NIT

Tea Break

Morning – Session 2 (12:00 pm to 1:00 pm)

Moderator: Bryce Johnson

Introduction to Key Concepts in Physics (from Classical to Quantum)

Theodore Hodapp

Quantum mechanics represents the work of hundreds of scientists across many decades to understand the fundamental laws that govern nature at the microscopic level. It is the most precise theory ever developed and has never failed an experimental test. In this introductory discussion, we will explore differences between classical physics (laws that predict the motion of everyday objects like chairs, the Moon, and bouncing balls), and quantum physics (which predicts how electrons, atoms, and protons behave). Fundamental concepts that underlie the discussions of the next few days will be discussed.

(45 minutes + 15 minutes Q&A)

Lunch

Afternoon – Session 3 (2:15 pm to 3:45 pm)

Buddhist Schools on Particles

Geshe Thabkhe

In Buddhism the concept of part-less particles is described with noted differences between the major philosophical schools of Buddhism. My presentation will describe the different schools and how we understand particles from a philosophical perspective, with a focus on the origins of particles, how they interact, and what is the nature of particles.

(25 minutes + 20 minutes Q&A)

The Double Slit Experiment

Anil Ananthaswamy

We will explore some of essential concepts in quantum mechanics by examining the double-slit experiment. The experiment, when done with single particles of light, becomes very compelling and difficult to explain using classical physics. Light sometimes behaves like a wave and sometimes like a particle, and at the heart of this wave-particle duality seems to be the act of observation or measurement, the choice of whether to observe the photon's particle nature or wave

DAY 1- OCT 4TH

nature. The talk will discuss this duality, along with notions of indeterminism and the idea of quantum systems being in multiple states at once.

(25 minutes + 20 minutes Q&A)

Tea Break

Afternoon – Session 4 (4:15 pm to 5:30 pm)

Panel Discussion 1: Causes & Effects

(45 minutes)

Introduction by Monastics Graduates (10 min)

AUDIENCE QUESTION AND ANSWER – BREAK OUT SESSION (30 minutes)



Morning - Session 1 (10:00 am to 11:00 am)

Moderator: Theodore Hodapp

Consciousness, Phenomena, and Observation - The relationship between subject and object in the four Buddhist philosophical schools

Khenpo Chawang

According two of the Buddhist schools, when we perceive the phenomena, the objects that we observe are intrinsically out in the world, and exist independently of any observation. In a third school, observations depends entirely on the mind, there is no outer reality. And finally, in the fourth school, all phenomena exist interdependently between subject and object and are thus void of existing inherently.

(25 minutes + 15 minutes Q&A)

Does the Quantum World Exist Before Observation?

Anil Ananthaswamy

This talk will focus on a special case of the double-slit experiment called the Mach-Zehnder interferometer, done with single photons or particles of light. John Wheeler used this setup to design what he called the Delayed-Choice Experiment—in which the choice of whether to observe the particle nature or the wave nature of light is delayed until after the photon

<u>Day</u> 2 - oct 5th

has entered the experimental apparatus and has "decided" to behave accordingly. By delaying the choice do we make the photon go back in time and undo its previous state? Or does the photon have no reality until observed?

(20 minutes)

Tea Break

Morning - Session 2 (11:30 am to 1:00 pm)

Measurement of Quantum Systems: state of knowledge and Ayattana

Areeya Chantasri

Quantum states (including wavefunctions) are quantities describing quantum systems of interest. But how can we determine quantum states, especially when measurement destroys the states every time it is applied? We will explore ideas of generalized quantum measurement, quantum state tomography, and how they are used in some experiments. Among many interpretations; one can view quantum states as states of our knowledge which can change according to measurement results. This talk will also present possible connections between this view of quantum theory and Buddhism's ideas of Ayattana, the six sense bases for sensation.

(25 minutes + 20 minutes Q&A)

Panel Discussion 2: The nature of observation: Subject and Object

(45 minutes)

Introduction by Monastics Graduates (10 min)

Lunch

Afternoon – Session 3 (2:15 pm to 3:45 pm)

The problem of measurements in quantum mechanics

Ian Durham

Western philosophy traditionally distinguishes between problems of ontology (problems of existence or "being") and problems of epistemology (problems of knowledge). Most modern physical theories are similarly very clear about what, within the theory "exists" and what constitutes knowledge. As a theory that is primarily concerned with the results of measurements, quantum theory presupposes the existence of a system that is under investigation (object) and, necessarily, a "measurer" (subject). But the theory is not clear about who or what qualifies as the subject. That is, it is not clear about which parts of the theory are ontic and thus refer to the object, and which parts of the theory are epistemic and thus refer to the subject. This is particularly problematic in cases where the act of measurement changes the very nature of the system under investigation. This is referred to as the quantum measurement problem and constitutes the fundamental tension between

DAY 2 - OCT 5th

quantum physics and classical physics. In this talk, we briefly introduce the quantum measurement problem and some of the issues it raises.

(25 minutes + 20 minutes Q&A)

A Brief History of Quantum Nonlocality

Howard Wiseman

In plain quantum theory, the result of a measurement at one point in space can instantaneously change the quantum state at points arbitrarily far away. Albert Einstein was worried about this "action at a distance" and thought that plain quantum theory needed to have something added to it to fix the problem. Surprisingly, John Bell came up with a theorem (a mathematical proof) that such a fix is impossible: if the predictions of quantum theory are correct, then no theory of the type Einstein wanted can be valid. Moreover, recent experiments have confirmed the relevant predictions convincingly.

(25 minutes + 25 minutes Q&A)

Tea Break

Afternoon – Session 4 (4:15 pm to 5:30 pm)

Panel Discussion 3: Appearance versus Reality

(45 minutes)

Introduction by Monastics Graduates (10 min)
AUDIENCE QUESTION AND ANSWER – BREAK OUT SESSION
(30 minutes)

Morning - Session 1 (10:00 am to 11:00 am)

Moderator: Anil Ananthaswamy

The Two Truths

Geshe Lhakdor

Form or any other existent phenomena is merely attributed by thought and naming as they appear or arise. When left without deeper investigation, it operates in a satisfactory way. It functions and is therefore not at all non-existent. Form and so forth thus has two aspects or identities: its conventional nature and its ultimate nature. The relationship between the conventional nature and the ultimate nature are like water and wetness. They are different but are of one entity, in that you cannot have the one without the other. The way the higher Buddhist schools explain ultimate truth or emptiness is not only more powerful in counteracting the misconception of the true existence of persons and phenomena, but also does not contradict phenomena's conventional reality.

(40 minutes)

Panel Discussion 4: What is objectively out in the world?

(20 minutes)

Tea Break

Morning – Session 2 (11:30 am to 1:00 pm)

Interpretations of Quantum Mechanics

Ian Durham

Because quantum theory is not clear about which of its parts refer to things that exist and which of its parts refer to things that constitute knowledge, it requires interpretation. That is, since the theory does not specify what exists versus what is knowledge, physicists and philosophers must interpret what the theory is telling us. This has led to a wide range of interpretations of the theory. In this talk, we briefly summarize the various classes of interpretations and discuss how each class attempts to address the quantum measurement problem.

(20 Minutes)

Bell's Theorem, Causation and Interpretations

Howard Wiseman

Bell's theorem can be stated in different ways, but one way, that may be of particular interest here: using ideas of causality. We will state, using very little mathematics, seven reasonable-sounding assumptions about the world and about causality, that, when taken together, lead to conclusions that have been refuted by experiment. Thus at least one of these assumptions must be wrong. This talk will discuss which assumptions are rejected by different versions of quantum theory.

(20 minutes)

Panel Discussion 5: Interpretations of Quantum Mechanics

(50 minutes)

Lunch

Afternoon – Session 3 (2:15 pm to 3:45 pm)

Panel Discussion 6: Nature and Fundamental Principles of Physics and Buddhism

(55 minutes)

Introduction by Theodore Hodapp (10 min): Physics (and science in general) is governed by basic assumptions that allow it to be continuously improved, and refuted when assumptions are shown to be incorrect. This panel will explore some of these basic assumptions and seed a conversation on how science "knows what it knows."

AUDIENCE QUESTION AND ANSWER - BREAK OUT SESSION

(35 minutes)

Tea Break

DAY 3 - OCT 6^{TH}

Afternoon – Session 4 (4:15 pm to 5:30 pm)

Panel Discussion 7: Quantum Physics and Ethics, Spirituality

(50 minutes)

Introduction by Howard Wiseman (10 min)

Closing Remarks - Geshe Lhakdor

(25 minutes)

Conference Presenters

Anil Ananthaswamy is a journalist and author. He teaches an annual science journalism workshop at the National Centre for Biological Sciences in Bengaluru, India. He writes regularly for the New Scientist, and other outlets such as Nature, Quanta and Scientific American. His first book, The Edge of Physics, was on cosmology and astroparticle physics, and his second book, The Man Who Wasn't There, explored the neuroscience of the human sense of self. His latest book, *Through Two Doors at Once*, tells the story of quantum mechanics told from the perspective the double-slit experiment.

Areeya Chantasri is a postdoctoral researcher working with Prof. Howard Wiseman, at Griffith University, Australia. She graduated with a PhD in Physics from University of Rochester, New York, USA. Her PhD dissertation is related to questions in Quantum measurement theory. Areeya grew up in Thailand and learned Buddhism from a very young age. She is intrigued by scientific questions on how nature works and in philosophical questions about our minds, life, its meanings, and our existence. She also has interests in communicating science to public audience, and has participated in programs teaching high school students about quantum physics.

Khenpo Chowang is a Buddhist philosopher and teacher, and currently teaches at Gonjang Nyingma Shedra in Gangtok, Sikkim. From 1978 to 1985, he served as Head Lama (teacher) in a local government (public) school in Sikkim, and in 1985, he was appointed as Khenpo of the Sikkim Institute of Higher Nyingma Studies. In 1990, Khenpo Chowang completed a PhD in philosophy from the Vishwa Bharati Shantiniketan, W.B. Before that he completed his Acharya course from Cen-

tral Institute of Higher Tibetan Studies in Sarnath, India. Central Institute for Higher Tibetan Studies in Sarnath, India. In 2016, he retired after 30 years of service as a Buddhist philosophical teacher at the Nyingma Institute in Sikkim. Khenpo Chowang is a published author, with a book "A complete history of Sikkim" (2003) and he regularly participates in state and national seminars.

Howard Wiseman is a professor of physics at Griffith University in Australia. His research is in quantum theory, but he collaborates often with experimentalists. At one extreme, his work seeks to understand what quantum physics implies about the nature of the world. At the other extreme, it has potential applications e.g. in making better measurements, or in making communication more secure. He also has an interest in histories and legends, especially those that relate to Britain around 1500 years ago, and has written a semi-fictional book "Then Arthur Fought" based on his research.

Geshe Lhakdor is the director of the Library of Tibetan Works and Archives in Dharamsala, India. A distinguished Buddhist scholar, he was the English translator for His Holiness, the 14th Dalai Lama, for 16 years and has co-translated several of His books. He graduated from the Institute of Buddhist Dialectics, after 13 years of rigorous study. He also has a Master of Philosophy from the University of Delhi and a Geshe Degree (Doctor of Divinity) from Drepung Loseling Monastic University. He serves on several governing bodies and advisory boards in the Tibetan community, often at the direct recommendation of His Holiness the Dalai Lama, and is presently the chairman of the Education Council of the Central Tibetan Administration.

Geshe Thabkhe was born in central Tibet in 1979 and become a monk at the age of ten. In 1997 he came into exile, in India, and joined Sera Jey Monastery and in 2018 he completed his Geshe Lharampa (Doctor of Divinity). In 2004 he started attending science classes organized at his monastery by the Science Meets Dharma program and in 2007 joined annual workshops and leadership trainings organized by the Science for Monks program. In 2008, Thabkhe joined the Emory Tibet Science Initiative and was among the first batch of monks to study at Emory University. After returning from three years of study at Emory, in 2013, Thabkhe started teaching regular physics classes at his monastery.

Theodore Hodapp develops and directs education and diversity projects for the American Physical Society. Over the past 14 years he has developed programs to educate high school physics teachers, increase the number of women studying physics, and work to increase participation by underrepresented groups. Prior to this position he was a professor of physics at Hamline University. He also worked in industry, and national laboratories. His original scientific work was in experimental quantum optics.

Ian Durham is a physicist whose interests lie mainly in the deeper questions about the inner workings of the universe and the nature of reality. His two main areas of research focus on the intersection of quantum mechanics, relativity theory, and information theory, referred to as relativistic quantum information, and the foundations of physics, particularly the foundations of quantum mechanics and the nature of time. His research often touches on concepts in pure mathematics, astronomy, and even geology and engineering. He is a Professor and Chair of the Department of Physics at Saint Anselm College in Manchester, New Hampshire, an hour north of Boston.

