

Topic: 3.2 The new physics and religion - emerging questions

Procedure

*for higher level only - Heisenberg's uncertainty principle and the development of quantum theory
- science and the realm of chance, probability, and chaos*

The movement from the Newtonian paradigm with the deterministic universe of classical physics and the shift to the new physics began with the discovery of -

- i. Relativity and the rediscovery of time: time is inextricably linked to space
- ii. Heisenberg's uncertainty principle and the quantum world: Probability
- iii. The process of chance and necessity: Chaos Theory.

Research Assignment: THE NEW PHYSICS
SOURCES: Religion and Science – F. McCarthy & J. McCann etc.

Or Read extracts from *Copenhagen* by Michael Frayn (Methuen Drama, 1998 ISBN 0-413 72490 5)

Discuss: What was Heisenberg's uncertainty principle?
What key ideas are associated with 'new physics'?
How important are these ideas / principles for science today?

Take feedback and conclude the Heisenberg Principle of Uncertainty is a key aspect of quantum mechanics; it holds it is impossible to measure at the same time both the velocity and the position of a sub-atomic particle. Relativity, quantum mechanics and chaos theory have altered the way we see the world today. Today we view the universe as a dynamic interaction between the physical laws and the contribution of chance. Chance is not an alternative to law but the means whereby law is creative, allowing for the genuinely novel and the unpredictable.

- theological perspectives on these developments

Assignment: Create a timeline using 150 feet of thick twine based on the 'timeline' in Swimm, B., and Berry, T. *The Universe Story: From the primordial Falring Forth to the Ecozoic Era* (San Francisco: HarperCollins, 1992) 269-278.

Discuss: Does this give a sense of how humans and the earth are latecomers in the evolution of the cosmos?

Discuss: "A world of indeterminacy is not incompatible with religion or Christian faith."
Do you agree? Why? Why not?

Present the following:

"God did not produce a ready made world...(God) created a world able to make itself."
J. Polkinghorne - Traffic in Truth

"Earth is crammed with heaven and every common bush afire with God.
But only he who sees, takes off his shoes.
While all the rest gather blackberries." Elizabeth Barrett Browning - New York 1897 p. 466

"Sweet is the lore which nature brings;
our meddling intellect misshapes the beauteous forms of things;
We murder to dissect."
William Wordsworth - The tables Turned

Discuss: To what extent are any of these statements in keeping with the ideas associated with “new physics”?

Take feedback and conclude by highlighting the ways in which the new physics allows for human freedom and an open future, and is open to divine providential agency and eschatological completion. In an unfinished world, God is at the heart of the evolutionary process empowering it from within. God’s love as a self-emptying love (*kenosis*), allows the world to be itself, to be open to novelty and surprises that we find in the cosmic story.

Outcomes:

- Explain the Heisenberg’s uncertainty principle and its importance for science today
- Outline two of the key ideas associated with “new physics” and the importance of these for theological reflection

Resources which teachers have suggested include:

Swimme, B. and Berry, T. (1992) *The Universe Story: From the Flaring forth to the Ecozoic Era* San Francisco: Harper

Stannard, R. (1996) *Science and Wonders: Conversations About Science and Belief* London: Faber and FaberBook (of the BBC Radio 4 series)

Morgan, J.. (2000) *Born with a Bang: The Universe tells our Cosmic story* Book 1, Nevada: Dawn Publications (48 pages—brief and colourful)

Video: *Whispers of Creation*, BBC Horizon Programme 1994 - 50 minutes.

Creation, BBC: Everyman Programme , 1985 ,(45minutes).

Creationists versus evolutionists: The Blind Watchmaker, BBC Horizon 1987,50mins

Music: *Melodies of the Universe: Songs and chants*, by Jan Novotka, CD and booklet available from Earth Rise, Inc., 1151 Loomis Ave., Scranton, PA 18504. Tel:570 347-2431