Understanding Reality in Science, Philosophy, and Theology

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ECST XII, *Sigtuna, 30 April - 5 May 2008*

Abstract

A new way of understanding reality results from contemporary theology of science, which is focusing on God and the created universe. This requires a new epistemology based on an ontology exceeding the classical ontological principles. I hope that this should open philosophy and theology to the mathematical natural sciences that would admit a better understanding of man in his relation to God.

Nomen ist numen.

Chaos is the score on which reality is written.
- Henry Miller

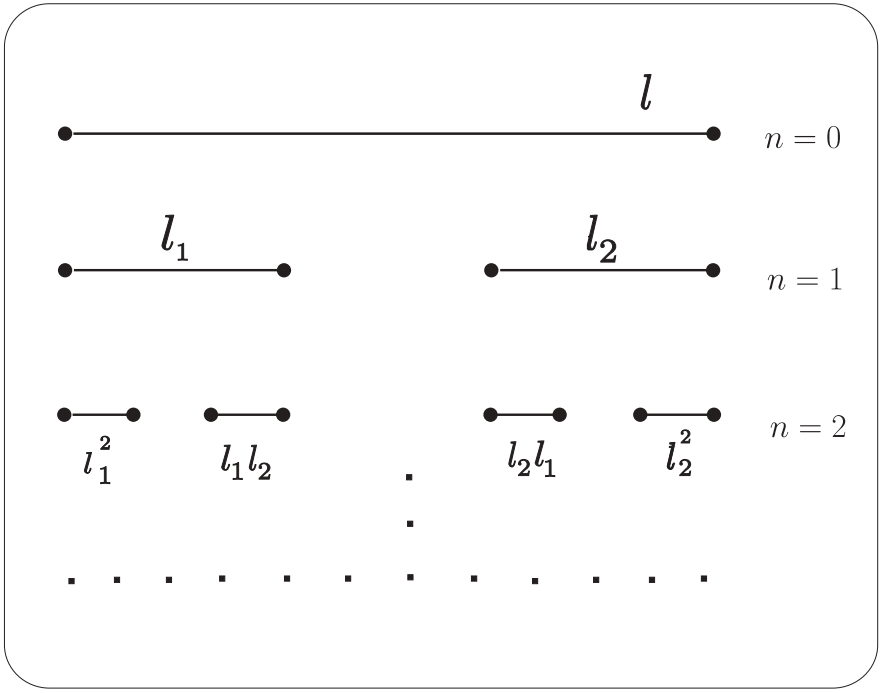
Plan of Presentation

1. Introduction
2. Understanding in Modern Mathematics
   - Chaos and Fractals Basics
   - Importance of Chaos and Fractals
3. Understanding in Modern Physics
   - Quantum Mechanics
   - EPR Paradox
4. Implications for Philosophy and Theology
5. Conclusions

Prologue

A **fractal** is a rough or fragmented geometrical object that can be subdivided in parts, each of which is (at least approximately) a reduced-size copy of the whole. Fractals are generally *self-similar* and independent of scale (fractal dimension).

A **multifractal** is a set of intertwined fractals. Self-similarity of multifractals is scale dependent (spectrum of dimensions).



Two-scale **Cantor** set.

Chaos and Attractors

CHAOS ($\chi\alpha o\varsigma$) is

- APERIODIC long-term behavior
- in a DETERMINISTIC system
- that exhibits SENSITIVITY TO INITIAL CONDITIONS.

An **ATTRACTOR** is a *closed* set A with the properties:

1. A is an INVARIANT SET
2. A ATTRACTS AN OPEN SET OF INITIAL CONDITIONS
3. A is MINIMAL

Local Realistic Theories of Nature

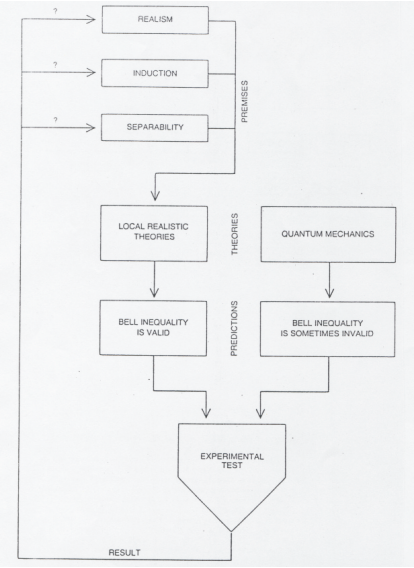


Fig. 1. Local realistic theories and quantum mechanics make conflicting predictions for certain experiments in which distant events are correlated.

Delayed-Choice Experiment

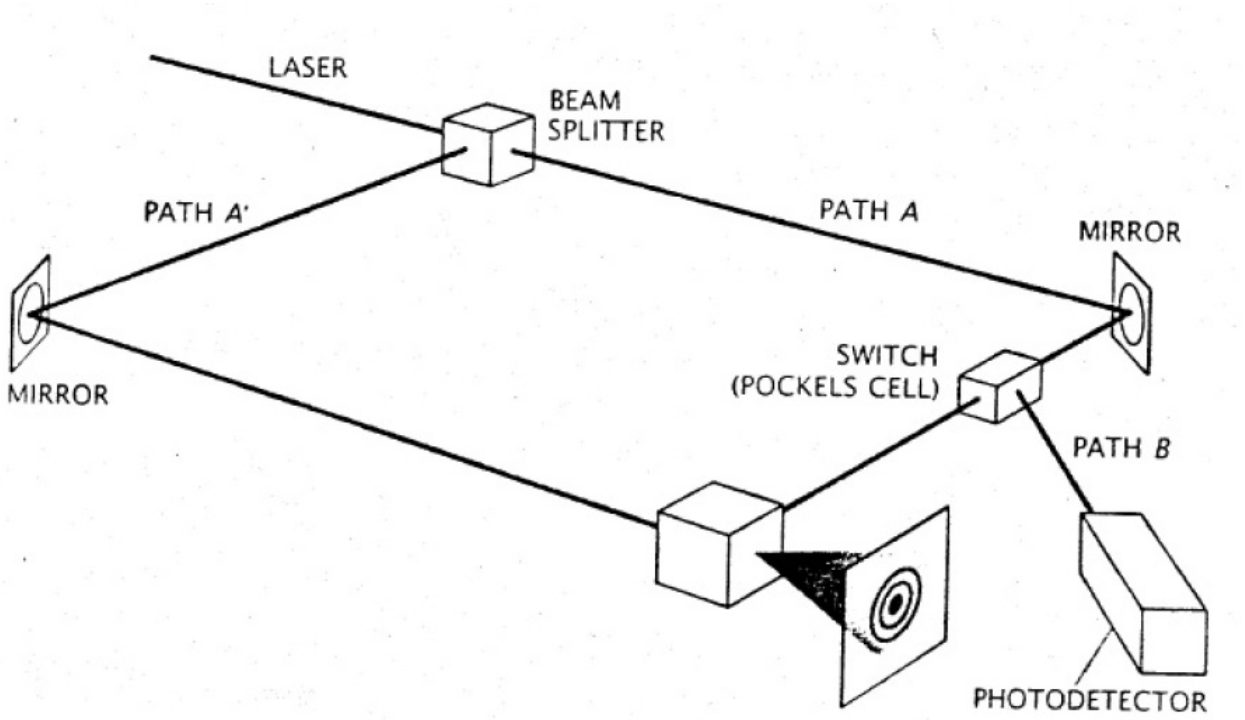


Fig. 2. A photon behaves like a wave when wavelike properties are measured and behaves like a particle when particle properties are measured.

Conclusions

- If we do not like to continue philosophical and theological studies in separation from science, then classic metaphysics should open its thought to the most important ideas and achievements of the mathematical natural sciences. In particular, twentieth century physics requires a new metaphysics with ontology exceeding the classical ontological principles. The classical metaphysics should only be a limiting approximation of the new metaphysics.

- The way of the limiting implication would probably be analogical just as quantum physics and relativistic physics would be the limiting cases of the new fundamental physical theory, containing both quantum and relativistic physics. Similarly as is in the case of classical physics describing the world of the senses, which in turn is the limiting approximation of quantum physics.

Epilogue

I hope that this **dynamic** concept of being will shed light on the nature of the universe, with man in his existential and historical dimensions, and maybe even will render possible a better intuition of God.

Thank you!

Wiesław M. Macek is Ordinary Professor at Faculty of Mathematics and Natural Sciences, Cardinal Stefan Wyszyński University in Warsaw, Poland, and at the Space Research Centre, Polish Academy of Sciences, also graduated in theology. He was a member of Plasma Wave Science team on the Voyager mission to Neptune in 1989. His recent research interests focus on nonlinear dynamics and fractal structure of the solar wind, and include theology of science.

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