Uncertainty

and the

End of Science

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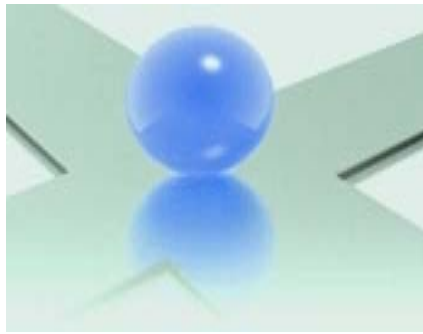
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§ **Info-gaps and quantum indeterminism**

2   *The End of Science?*

§ **Science:**

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§ **Several possibilities.**

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  Tentative 'Yes'.

  Maybe just interruption.

§ **Now we get serious:**

Whitehead, Hume, Dirac, Shakespeare.

§ **An axiom of science:**

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- Future regular recurrence is

  logically and empirically unprovable.
- Logical:

  We can't deduce future patterns from past patterns. Past patterns don't logically constrain the future.
- Empirical: The future can never be tested:

  One can never step on the rolled up part

  of a rug unfurling in front of you.

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- Science restricted, but not gone:
  - Individual events not explained.
  - QM restricted to ensemble patterns.
     (More on QM later.)

§ **Could Nature's indeterminism be lawless?**

So "out of joint: O, cursed spite"

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§ **Could Nature's indeterminism be lawless?**

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that no law can "set it right"? (Shakesp.)

§ **Conceivably 'Yes':**

The Unknown at its most rambunctious.

§ **Taking stock:**

- **LoNs necessary** for science to be possible.
- **Past success** of science: LoNs exist(ed).
- **Past doesn't determine the future.**

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§ **Warning: Nature is not a scientist.**

- Nature does not solve problems.
- Nature just **does it.**

§ **Other LoNs are different.**

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  Soln at each step predicts next state and
  reformulates the problem.
- Eg: Free fall in gravitational field:
  - Force depends on position.
  - Force changes with position.
- Solvable, but more difficult.

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  - **No soln can be obtained in finite time.**

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  - ○ Nature just **does it.**
  - ○ The **continuation of nature** doesn't depend on the **continuation of science.**

§ **Science fiction?** Maybe, but:

- Axiom of Natural Law not provable.
- Hume: past and future.
- Rug metaphor.

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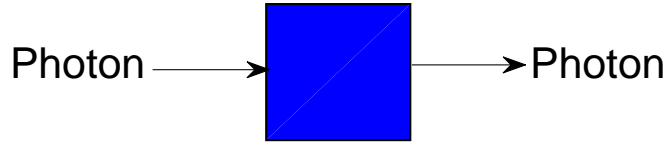-

§ **Will science become fruitless or boring?**

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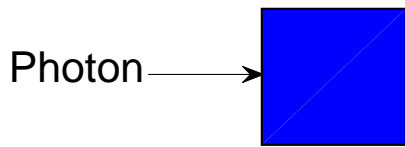• **Science thrives because science could end.**

3 *Quantum Indeterminism*

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§ Polarized Photons on Tourmaline

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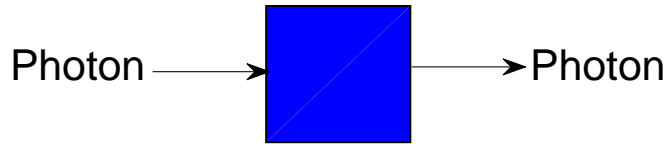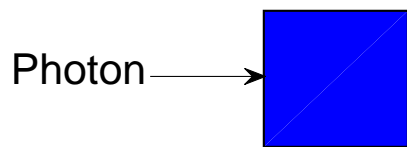
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- **What happened to Causality?**

- **Aren't there Laws of Nature?**

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§ **Info-Gap Interpretation of Quantum Theory:**

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- Events are **determinate.**
- Laws of Nature: **fluctuate indeterminately.**

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  ○ Maybe science is finished.

In Conclusion

Uncertainty:

The freedom to err,

The opportunity to create and discover.