

What I do say is “The commonality of my Now and your Now whenever we are together requires that our Nows must coincide at each of two consecutive meetings.” “Commonality” or “coincide” mean only that our two private Now experiences happen at a common place and time, not that they are identical. Indeed, the personal experiences of different people are incomparable, except through the imperfect medium of language.

I agree with James Hartle on much in the paper he cites, but we have important differences. He takes spacetime to be objective and fundamental; I take it to be an abstract tool used by an agent to organize her experience. He uses the notion of a point in spacetime uncritically; I regard it as an approximate representation of an agent’s spatially and temporally extended experience. He takes an agent’s experience to be an objective property of the agent, like the contents of a register. I take an agent’s experience to be private and self-evident to that agent and to be the fundamental basis for her inference of an external world; the experience of each agent plays a special role for that—and only that—agent, analogous to the special role played by “the classical domain” in the quantum mechanics of Lev Landau and Evgeny Lifshitz.

Rudolf Peierls wrote to John Bell in 1980, “In my view, a description of the laws of physics consists in giving us a set of correlations between successive observations. By observations I mean . . . what our senses can experience. That we have senses and can experience such sensations is an empirical fact, which has not been deduced (and in my opinion cannot be deduced) from current physics.”² If “us” is expanded to “each of us,” then nobody has ever put QBism and CBism more concisely than that.

References

1. N. D. Mermin, *Nature* **507**, 421 (2014).
2. S. Lee, ed., *Sir Rudolf Peierls: Selected Private and Scientific Correspondence*, vol. 2, World Scientific, River Edge, NJ (2009), p. 807.

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Out of Ehrenfest’s closet

The article by Dirk van Delft on Paul Ehrenfest’s final years (PHYSICS TODAY, January 2014, page 41) offers fascinating insights into the life of

a remarkable man. It also offers a speculation as to why Martin Klein never wrote the second volume he had originally planned for his Ehrenfest biography. As Marty told me many years ago, he took a sabbatical in Leiden, the Netherlands, when he began his research for the biography, and he visited Ehrenfest’s widow, Tatiana, fairly often during that time.

At some point—after volume 1 had been written, I believe—Marty visited Tatiana again. During that visit she inadvertently opened a closet, and papers that she had kept hidden came tumbling out. It was my understanding that Marty abandoned the second volume because he did not have access to those papers, which he considered essential and which I assume are the letters acquired by the Boerhaave Museum. The article by van Delft offers abundant clues as to why Tatiana wanted to keep them secret.

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UN’s Basic Space Science Initiative: A follow-up report

Almost 20 years after I first wrote about the United Nations and European Space Agency workshops on space science (PHYSICS TODAY, July 1996, page 90), I feel obliged to provide an update on the continuing initiative, which seems to be unique and is raising interesting and uncommon questions. The United Nations Basic Space Science Initiative (BSSI) is a long-term effort to develop astronomy and space science through regional and international cooperation, particularly in developing nations. In addition to the UN and ESA, NASA and the Japan Aerospace Exploration Agency have also cosponsored workshops.

The idea for the BSSI was first discussed in 1986 in New York. Among the participants in that discussion were I. I. Rabi and Dorothy Michelson Livingston.

From 1991 to 2004, the workshops on basic space science addressed the status of astronomy in Asia, Latin America, and Africa. As a result of those workshops and with leadership from the National Astronomical Observatory of Japan, telescope facilities were inaugurated in 7 developing nations and planetariums were established in 20, with equipment donated by Japan.



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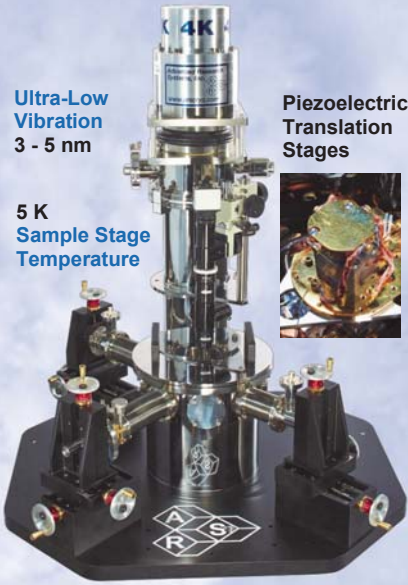



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Beginning in 2005, workshops focused on preparations for and follow-ups to the International Heliophysical Year 2007. The IHY's legacy includes the current operation of 16 instrument arrays, with more than 1000 instruments recording data on solar-terrestrial interactions that range from coronal mass ejections to variations of the total electron content in the ionosphere. Organizations in Armenia, Brazil, France, Germany, Israel, Japan, Switzerland, and the US are providing instruments to the host institutions.

Starting in 2010 the workshops have addressed the International Space Weather Initiative (<http://iswi-secretariat.org>). Attendees reviewed the scientific results from the instrument arrays and discussed ways and means to continue space-weather research and education.

A full BSSI report, presented to UN member states in June 2013, is available at http://www.oosa.unvienna.org/pdf/limited/1/AC105_2013_CRP11E.pdf.

Peter Gruss, former president of the Max Planck Society, recently noted that "each new field [of research] must be sustainable for 20 to 25 years." He also wrote, "How good research is in any given country is dependent on the tal-

ent of its researchers and the genius of the best of them." The initiative is now 25 years old, involves all nations, and has enjoyed the freedom and the mandate to address particularly innovative topics.

The BSSI is now preparing to reevaluate the research results of the whole initiative. I invite readers of PHYSICS TODAY to send me their ideas for specific criteria for such a reevaluation process.

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Emergent-function realities

The letter by Moorad Alexanian (PHYSICS TODAY, February 2014, page 12) suggests that some realities, such as consciousness, free will, and the mind, are beyond science. Those essentially human phenomena are sometimes called subjective realities. I think it's better to call them for what they are: emergent-function realities. A car, for example, can be analyzed in great detail, but its main value is the emergent function of transport: move and carry. The horse also provided that

function, but the car has had a profound effect on the social behavior of humans. Its emergent-function reality, not seen in its parts, can be deduced from a functional analysis and studied through its effect on human activity.

Many of the realities that we find mysterious, including life itself, are emergent functions. Life emerged from the self-assembly of the first "living" cell. Consciousness and other such subjective realities are emergent functions arising from the complexity of the physical brain and nervous system. Learning just how they arise is of great interest. And they can be studied scientifically by measuring their effect on human behavior. Perhaps the statement that science can handle "everything" is broader than Alexanian believes.

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Correction

June 2014, page 28—The facility in the photograph was incorrectly identified as the Vermont Yankee nuclear power plant; it is actually the Virgil C. Summer Nuclear Station in Jenkinsville, South Carolina. ■

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