Similarly, quasiparticles, "Rindler" particles, bogolons, magnons, holes, Goldstone bosons and so on, Strocchi simply calls "elementary excitations" or "modifications" of a given reference state.

If I had to single out the most striking concept in Strocchi's book, then I would pick what he calls a "Haag charge" (after R. Haag, who in *Nuovo Cimento* **25**, 287 [1962], introduced it into condensed matter physics). This object together with the idea of a "ground state" must rank among the most important concepts in QM_∞. Both of them serve as identifying labels of a given representation space of quantum states. The latter highlights the microscopic (elementary particle) aspects of QM_∞ while the Haag charge focuses itself on the macroscopic (condensed matter) aspects. It is analogous to the angular momentum operator for the hydrogen atom or to the three-dimensional oscillator in ordinary quantum mechanics: It commutes with all relevant quantum operators, it is a physically significant multiple of the identity on each irreducible representation space, and it hence makes an exact solution of the quantum mechanical problem possible. In fact, following Haag, Strocchi illustrates the usefulness of Haag charges by solving exactly the models for superfluidity and superconductivity.

Furthermore these "charges" evidently establish a link between the representation problem and the dynamical problem of a broken-symmetry system. They must play a very fundamental role in QM_∞, at least in phenomena where an order parameter emerges when a continuous symmetry is broken. Thus, the Haag charges can refer to:

▷ the number concentration of a superfluid condensate

▷ the gap parameter of a superconductor

▷ the magnetization of a Heisenberg ferromagnet.

Common to these as well as all the rest of Strocchi's archetypes is the fact that translation symmetry does not get broken. Strocchi considers only those representation spaces of a given system on which parallel-translational symmetry can be implemented by unitary transformations. Thus he excludes the example of an acceleration-partitioned relativistic system (William G. Unruh, *Phys. Rev. D* **14**, 870, 1976). This system has the peculiar property that the Minkowski vacuum has a finite temperature T with the well-known Davies–Unruh value $(1/k)(\hbar/2\pi)(a/g)$, where a is the acceleration. Furthermore the ground state of this system breaks the translation symmetry and has the macroscopic attributes of liquid light, that is, of photons in the configuration of a superfluid.

One cautionary remark: Strocchi puts great technical demands on his readers, with no qualms about condensing nontrivial calculations or demonstrations. This should not deter an active reader. The inclusion of such calculations would only detract from learning through Strocchi's illustrative examples the central structures of QM_∞.

I found these notes extremely rewarding because not only did they enlarge my physics horizon, but they did so where it counts.

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BOOK NOTE

The Beginnings of the Nobel Institution: The Science Prizes, 1901–1915

Elisabeth Crawford
Cambridge U. P., New York, 1987 [1984]. 281 pp.
$39.50 hc ISBN 0-521-26584-3; $16.95 pb ISBN 0-521-34747-5

The Nobel Population 1901–1937: A Census of the Nominators and Nominees for the Prizes in Physics and Chemistry

Elisabeth Crawford, J. L. Heilbron and Rebecca Ullrich
Univ. of Calif., Berkeley, 1987. 337 pp. $20.00 pb
ISBN 0-918102-15-4

Recently reissued in paperback, *The Beginnings of the Nobel Institution* traces the background of the Nobel Prize and its early years. Elisabeth Crawford discusses how the vague last wishes of Alfred Nobel, the inventor of dynamite, were implemented in setting up a large fund, "the interest on which shall be annually distributed in the form of prizes to those who, during the *preceding* year, shall have conferred the greatest benefit on mankind" (emphasis added). The author focuses on the physics and chemistry prizes awarded annually by the Royal Swedish Academy of Sciences. A major factor in the selection of the prizewinners before World War I was the experimentalist bias in the composition of the Nobel Prize commit-

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tees (for example, spectroscopists from Uppsala such as Knut Ångstrom). The book discusses networks of influence at work in the selections, particularly those of Svante Arrhenius, who received the Nobel Prize in Chemistry in 1903, and Gösta Mittag-Lefler, a mathematician of international standing. The latter intervened successfully on behalf of Marie Curie but failed in many attempts to achieve recognition for mathematical physics by getting the Nobel Prize awarded to Henri Poincaré. Another problem candidate was Max Planck, winner of the 1918 prize in physics. Even the subject area of recent developments was problematic for the Nobel committee, as exemplified by Ernest Rutherford's Nobel Prize in 1908 for *chemistry*. At first the Nobel Prize often received attention for the sheer size of the monetary award. However, the generally excellent choices in those early years provided a firm foundation to assure the continuing significance of the award.

Just issued by the Office for History of Science and Technology at the University of California, Berkeley, and the Office for History of Science at Uppsala University is *The Nobel Population 1901–1937*, a valuable reference for students of the history of the modern physical sciences.

—Per H. Andersen

NEW BOOKS

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Astrophysical Jets and Their Engines. *NATO ASI Series C: Mathematical and Physical Sciences 208.* Proc. Inst., Erice, Italy, September 1986. W. Kundt, ed. Reidel, Boston, 1987. 256 pp. $59.50 *hc* ISBN 90-277-2548-9

Dynamical Evolution of Globular Clusters. *Princeton Series in Astrophysics.* L. Spitzer. Princeton U. P., Princeton, N. J., 1987. 180 pp. $35.00 *hc* ISBN 0-691-08309-6; $14.50 *pb* ISBN 0-691-08460-2. *Monograph*

Exploring the Southern Sky: A Pictorial Atlas from the European Southern Observatory. S. Laustsen, C. Madsen, R. M. West. Springer-Verlag, New York, 1987. 274 pp. $39.00 *hc* ISBN 0-387-17735-3. *Lay readers*

Elementary-Particle Physics

Elementary Particles. *Enrico Fermi International School of Physics 92.* Proc. Sch., Varenna sul Lago di Como, Italy, June 1984. N. Cabibbo, ed. North Holland, New York, 1987. 502 pp. Dfl 300.00 ($158.00) *hc* ISBN 0-444-87075-X

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