



Figure 1 Gold dust. A side view of one of the first high-energy collisions captured by the Solenoidal Tracker of the STAR detector at the Relativistic Heavy Ion Collider (RHIC). The initial head-on collision of two gold ions, each consisting of a total of 197 protons and neutrons, occurs at the mid-point of the central tube (running across the image from right to left). The tracks indicate the paths taken by thousands of subatomic particles created in the fireball of energy set free in these collisions. Several layers of detectors, arranged concentrically around the central tube, and encased in a powerful magnet, allow the identification of these particles. (Courtesy of Brookhaven National Laboratory, STAR collaboration.)

space — be occurring as well? Theoretical calculations indicate that at such temperatures the pairs that make up the chiral condensate will break apart. When the condensate vaporizes, the full underlying chiral symmetry of QCD becomes operative. This change in the properties of ‘empty’ space last occurred throughout the Universe in the early moments after the Big Bang, when temperatures were as high as those reached in the RHIC fireball. This and similar vaporizations of other condensates at higher temperatures play an important role in modern cosmological thinking. Such an event might, for example, have triggered an epoch of inflation — a period of accelerated growth in which the horizon of the Universe expanded, temporarily, much faster than the speed of light.

Vaporization of the chiral condensate affords by far our best opportunity to access a phase transition of empty space in a controlled terrestrial experiment. The difficulty arises not so much in creating the necessary extreme conditions, but in reconstructing from the ashes available to us what happens during the initial stages of the experimentally created fireballs. Cramer *et al.*¹ use correlations between observed π -mesons to reconstruct properties of the medium through which they travelled. Previous models have had difficulty in dealing with these correlations, resulting in what has been

called the ‘HBT puzzle’⁷. Only by allowing for the possibility that the medium significantly alters the properties of the π -mesons, in the way expected if that medium were free of the chiral condensate^{8,9}, do Cramer *et al.* achieve a satisfactory fit to the data they consider. Thus, they may both resolve an old puzzle and open a new vista. Whether their model can be extended successfully to cover additional phenomena, and whether models based on other ideas can be equally successful, are questions sure to receive considerable attention in the near future. ■

Frank Wilczek is at the Center for Theoretical Physics, Massachusetts Institute of Technology, 77 Massachusetts Avenue 6-305, Cambridge, Massachusetts 02139-4307, USA.
e-mail: wilczek@mit.edu

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100 YEARS AGO

A description of the large diamond found recently in the Premier Mine, Transvaal, is given in the *Geological Magazine* (April) by Dr. F. H. Hatch and Dr. G. S. Corstophine, with reproductions of four photographs which represent the diamond in its actual size from four different points of view... The stone is bounded by eight surfaces, four of which are faces of the original crystal, and four are cleavage surfaces, which are distinguished from the original octahedral faces by greater regularity and smoothness. For a large stone the crystal is of a remarkable purity... The stone, which has been named the Cullinan diamond, weighs 9600.5 grains troy, or 1.37 lb. avoirdupois; this is more than three times the weight of the largest diamond previously known.

ALSO:

In proposing the toast of “The Japan Society” at its annual dinner on May 3, Sir Frederick Treves referred to the medical and surgical ability of the Japanese. Nothing astounded him more, he said, in his recent visit to Japan than the way in which the Japanese have inquired into the medicine and surgery of the western world and the marvellous thing they are making of it... The Japanese have all the qualities of a surgeon. They have infinite patience and infinite tenderness. Sir F. Treves is confident that not many years hence there will be seen in Japan one of the most progressive schools of medicine the world has ever known. From *Nature* 11 May 1905.

50 YEARS AGO

In 1947, Evans and Guild described a technique for the quantitative extraction of earthworms. This consisted of treating a known area with a solution of potassium permanganate (1.5 gm. per litre) at the rate of 6.8 litres per sq. metre. The method was said to recover a high proportion of the total population... I found, however, that population estimates obtained by the permanganate technique were considerably lower than those suggested when a more laborious hand-sorting method was employed. In order to measure the relative efficacy of these techniques, permanent pasture on light soil of alluvial origin was sampled by both methods contiguously... While the fifty soil cores... produced 639.5 worms, the permanganate samples... produced only 350 worms. J. A. Svendsen
From *Nature* 14 May 1955.