

International position of US physics

In order to assess changes in the standing of physics in the US over the past few years, we have undertaken a simple study of the situation in one particular subfield, the physics of electronic and atomic collisions. Using the proceedings from the last five International Conferences on the Physics of Electronic and Atomic Collisions, we have tried to determine if a shift

relative decline.

Two new areas in which the US is particularly lagging are experimental research with high-energy accelerators and with lasers. Some scientists are overcoming the handicap of a lack of facilities in the US by participating in collaborative efforts in Western Europe. Such research by US scientists accounted for 4%

of the contributed papers at the Paris meeting. (Complete tables of the information used for figures 1 and 2 are available from the authors.)

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GUEST COMMENT

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has occurred in the position of US research activities as measured by the fraction of contributed papers from various geographic areas as well as by the attendance figures available to us.

Since 1958, ICPEAC has been held at roughly two-year intervals and has attracted large and representative groups of atomic-collision physicists. The meetings have been broadly international throughout, but there has been understandable variation in participation, depending on the location of the conference site. Even taking such variations into account, we find it possible to see some encouraging and some disquieting trends.

Figure 1 shows the geographic distribution of the authors of several hundred papers contributed to each meeting. Comparing two meetings held in Western Europe (Amsterdam 1971 and Paris 1977) we see an increase of 50% in the total number of papers, but the US share, while remaining almost constant in number, has dropped from almost one-half to one-third of the total.

Figure 2 shows a particularly dramatic decline in US attendance this year both in absolute and relative numbers. Western Europe has been the biggest gainer.

We know, of course, that a multitude of effects contribute to such changes, but we feel that the figures support the conclusion that while atomic-collision physics is a vital field of research exhibiting strong growth, the US involvement in it has remained constant, resulting in a noticeable



Who discovered matter waves?

I found Richard Gehrenbeck's "Electron diffraction: fifty years ago" (January, page 34) to be a splendidly informative account of Clinton Davisson and Lester Germer's work on matter waves (the observation of which is, I would suggest, one of the two most important empirical discoveries of the period since 1920—the other being the discerning of the universal galactic expansion). Many physicists must have often wondered, as have I, "How did Davisson and Germer happen to be reflecting electrons from a nickel crystal?", and it is satisfying now to know the answer.

Gehrenbeck emphasizes how ready European theorists were to accept the existence of electron waves, even on the basis of Davisson and Germer's initially rather slight evidence. In this connection, PHYSICS TODAY readers might be interested in the following account by Max Born, from the overseas side:¹

"This is de Broglie's law. He studied the consequences for plane waves and indicated the interpretation of Bohr's quantum conditions with the help of standing waves. But what did he predict? As far as I know, nothing. Then were the interference fringes of cathode rays discovered experimentally? There is no truth in this either. The real facts are these: Directed by a remark of Einstein, my colleague Franck and I pondered about the meaning of de Broglie's waves. One day I received a letter from Davisson in America, containing accounts of measurements on the reflexion of electrons by nickel crystals with the question whether we could make