

Quotes

- **Julian Schwinger**

Schwinger said "The usual viewpoint, derived from the hot fusion experience, is that the rate of fusion reaction is the product of the penetration factor for the repulsive Coulomb barrier - with the intrinsic rate of fusion. The two factors: penetration probability and intrinsic fusion rate are independent. But in the very low energy cold fusion, one deals essentially with a single state, described by a single-wave function, all parts of which are coherent. A separation into two independent, incoherent factors is not possible, and all considerations based on such a factorization are not relevant."

The quote is from a lecture given by Schwinger at the University of Bourgogne in 1990. It is taken from *Climbing the Mountain, the Scientific Biography of Julian Schwinger* by J. Mehra & K. A. Milton (Oxford University Press, New York, 2000), p. 554.

In a lecture on cold fusion given in Salt Lake City in 1990, Schwinger recalled, "Apart from a brief period of apostasy, when I echoed the conventional wisdom that atomic and nuclear energy scales are much too disparate, I have retained my belief in the importance of the lattice." [Mehra and Milton, p. 550]

Schwinger resigned from the American Physical Society in 1990, after the APS refused to publish his paper on cold fusion. He was a Nobel Laureate, and competes with a few others for being the most important US-born theoretical physicist. Schwinger died in 1994.

- **Robert B. Laughlin**

Laughlin wrote: "In the early days of quantum mechanics it was discovered that many properties of real metals could be explained by postulating the electric forces between their electrons not to exist. It was not clear why this should work, but the properties of these highly idealized electrons were sufficiently simple that they could be calculated in a spare moment on a napkin, and these calculations matched experiment well. This fact turned out to be extremely useful in engineering and allowed one to anticipate reasonably accurately what metals should do in new situations. Unfortunately, it also had the effect of suggesting that matter *ought* to behave in this way, a fundamentally incorrect idea. The forces between electrons are, in fact, enormous, and their irrelevance to these experiments nothing short of astonishing."

This statement is from Robert B Laughlin, *A Different Universe*, (Basic Books, Cambridge MA, 2005) pp. 84-85. Laughlin is a Nobel Laureate.

Electrons are subject to the same Coulomb barrier that Schwinger refers to. Although, some electrons are kept separate by the Pauli exclusion principle, spin-paired electrons are kept apart only by the Coulomb

barrier. This quote is important because the same physics that allows cold fusion also explains the Laughlin paradox.