The centuries-old belief in the impossibility of perpetual motion machine provoked an obvious mistake in the 20th century.

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I will talk about the obvious mistake on which the theory of superconductivity are based. This mistake should convince the scientific community in violation of the second law of thermodynamics since it was provoked by the centuries-old faith in the impossibility of a perpetual motion machine.
The theory of superconductivity and thermodynamics are not the only modern delusions provoked by blind faith. At the beginning, I will briefly talk about another delusion provoked by blind faith in quantum mechanics.

Most scientists deny the role of faith in the natural sciences, such as physics, although these sciences are based on the faith in the cognizability of Nature. Many modern scientists ignore the questions such as: "How can our reason cognize Nature?" and "What exactly can our reason cognize?"

The great philosopher Immanuel Kant made the following conclusion about the cognitions of Nature more than two centuries ago:

1) The cognition of Nature is the creation of consistent ideas about the cause of the phenomena we observe.

2) We create our ideas about Nature on the basis not only of empirical data, but also of our a priori knowledge.

3) We can know only our ideas about Nature but not Nature as thing-in-itself.

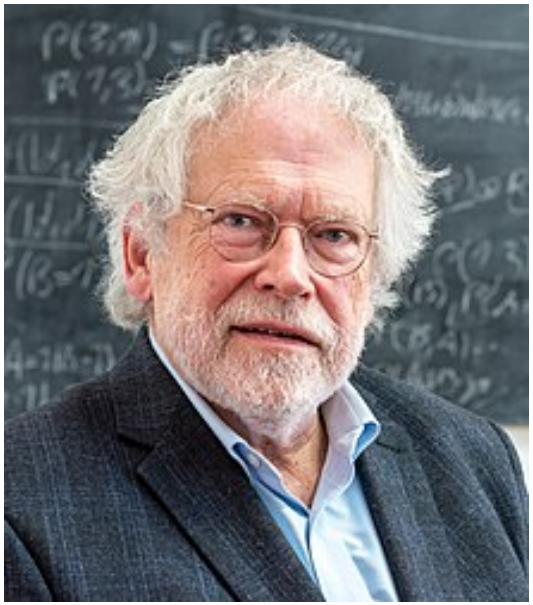
4) Nature must conform to our cognitive abilities rather than our cognitive abilities must conform to Nature in order the cognition can be possible at all.

The modern crisis of physics was largely provoked by the ignorance of Kant's philosophy. Quantum mechanics is the most obvious manifestation of this crisis. This theory appeared due to the confidence of its creators that Nature must always correspond to our cognitive abilities. Heisenberg, Bohr and others created very successful theory. But quantum mechanics is not a scientific theory because of its contradiction with our a priori knowledge such as realism.

The attitude of most scientists to quantum mechanics is one of the most revealing examples of faith instead of understanding. Only few physicists, Einstein, Schrodinger and others understood that quantum mechanics is a trick rather than a physical theory because of its contradiction with realism. Most physicists ignored during a long time this contradiction. And now many scientists are sure that quantum mechanics and experimental results can refute realism. The Nobel Prize in Physics 2022 was awarded for experiments that refute local realism, according to the majority opinion.

Alain Aspect
French physicist

John Francis Clauser
American physicist



Anton Zeilinger
Austrian physicist

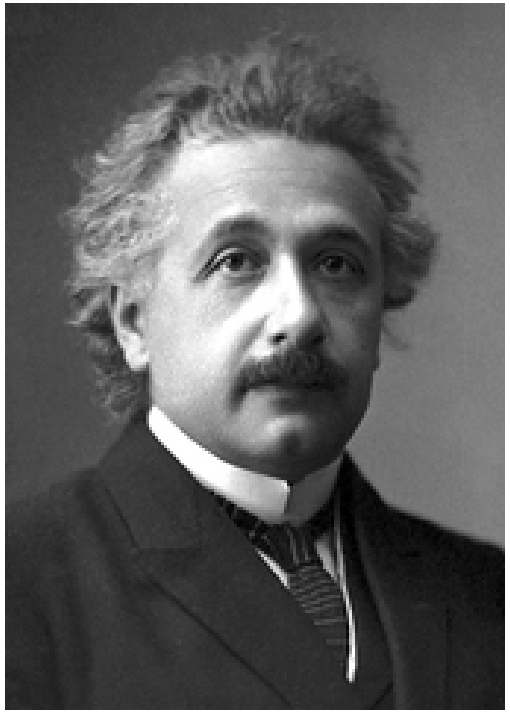
The Nobel Prize was awarded *for establishing the violation of Bell inequalities*. Almost all physicists are sure that quantum mechanics predicts violation of Bell inequalities, which refutes realism. It is funny, but this opinion is delusion. **Quantum mechanics cannot predict violation of Bell inequalities**. This mass delusion became possible because most physicists, unlike Einstein, do not understand that **realism is "*the presupposition of every kind of physical thinking*"** rather than a claim which can be disproved with experimental results.

Most modern scientists, including Nobel laureates, are sure that we can not only refute realism, but also create a real device, a quantum computer, based on the refutation of realism.

Despite the obvious logical absurdity of this confidence many national governments, military agencies, the world's largest companies such as Google, IBM, Intel and others spend a lot of money for quantum computing research in an effort to create a quantum computer.

Einstein understood the falsity of quantum mechanics, although he created its basis. He had to introduced in 1905 light quanta in order to describe the photoelectric effect (the Nobel Prize 1921) and wrote in 1951: "*All these fifty years of conscious brooding have brought me no nearer to the answer to the question, 'What are light quanta?' Nowadays every Tom, Dick and Harry thinks he knows it, but he is mistaken*".

The idea of a quantum computer became popular and the Nobel Prize in 2022 was awarded for refuting realism precisely because "*Nowadays every Tom, Dick and Harry thinks he knows, but he is mistaken*".



Albert Einstein
1879 - 1955

Albert Einstein, unlike every Tom, Dick and Harry, understood that the rejection of realism by the creators of quantum mechanics is a fundamental mistake that has provoked the delusion of several generations of physicists.

But even Einstein believed in impossibility of perpetual motion machine. He understood that "*thermodynamics is nothing more than a systematic answer to the question: what should be the laws of nature in order for a perpetual motion machine to be impossible*".

Therefore Einstein wrote:

"*Classical **thermodynamics is the only physical theory** of universal content concerning which I am convinced that, within the framework of applicability of its basic concepts, it **will never by overthrown***",

A. Einstein, Autobiographical Notes, 1949.

Even Einstein did not taken into account that our ideas about Nature has changed several times over the several centuries during which the faith in the impossibility of perpetual motion machine predominated. Some scientists still refer to the decision of the Paris Academy of Sciences made in 1775 to not consider any project of perpetual motion machine. Such references can hardly have a scientific basis, since the Parisian academicians could not have known in 1775 about not only, for example, quantum mechanics, but even thermodynamics.

Heat was considered as a liquid - phlogiston not only in 1775, but also in 1824 when the Carnot principle was postulated, which we call the second law of thermodynamics since Clausius's time, i.e. since the middle of the 19th century when heat was become to consider as a type of energy.

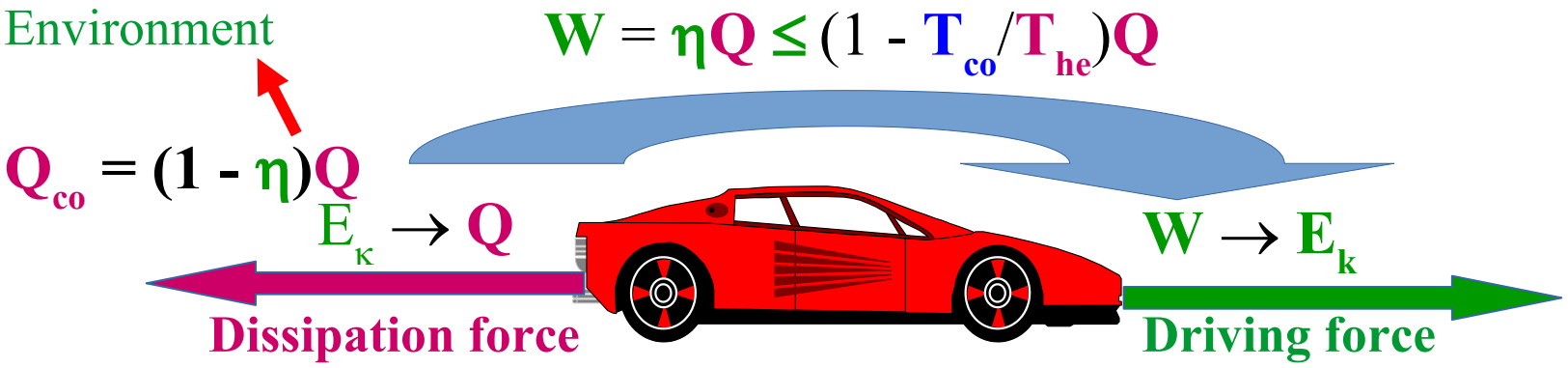
The possibility of a perpetual motion machine cannot be avoided according to the law of energy conservation if all processes in nature are reversible. Sadi Carnot postulated in 1824 the irreversibility in Nature in order to avoid this possibility.

Sadi Carnot postulated in 1824 that the efficiency $\eta = W/Q$ of conversion of heat Q into work W with the help any heat engine has the upper limit

$$\eta \le \eta_{max} = 1 - T_{co}/T_{he}$$

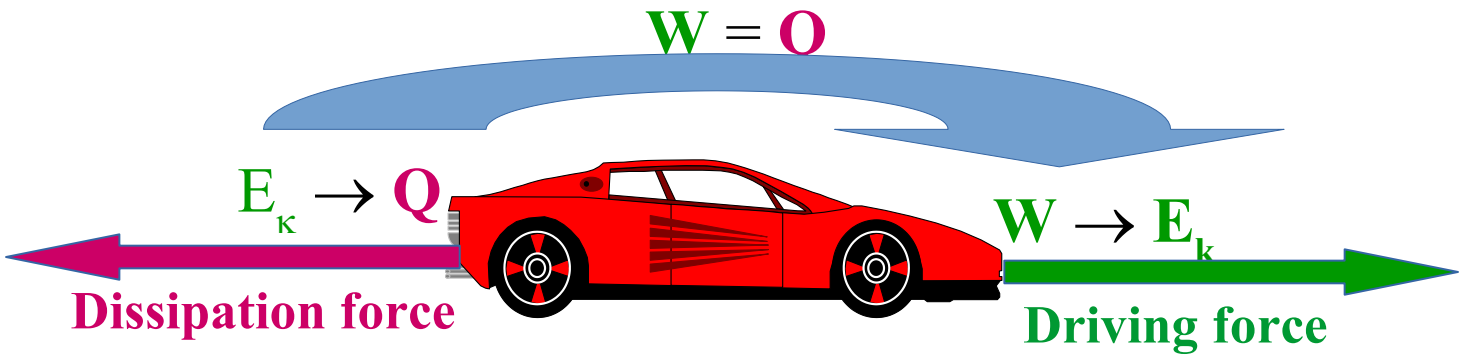
which is determined by the ratio T_{co}/T_{he} of the cooler temperature T_{co} to the heater temperature T_{he}. We cannot obtain a work $W = \eta Q$ from heat Q without a temperature difference $T_{he} - T_{co} = 0$ since the efficiency should be equal $\eta = \eta_{max} = 0$ in this case according to the second law of thermodynamics.

Sadi Carnot
1796 – 1832



We are forced to use fuels in heat engines, not to get energy, but to create a temperature difference $T_{he} - T_{co}$ because of the second law of thermodynamics.

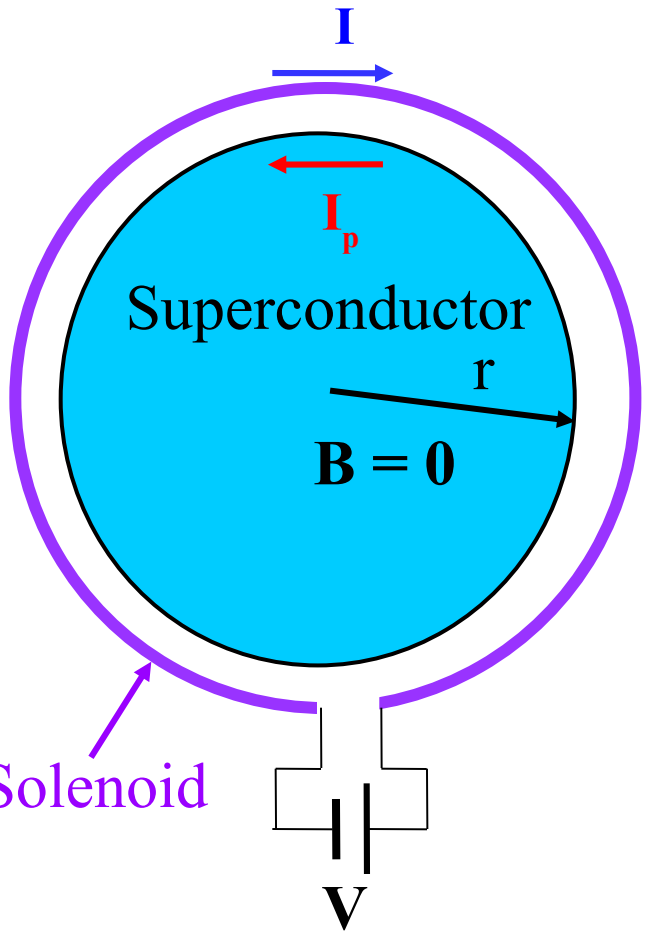
Any reproducible violation of second law of thermodynamics would be solved ***the world's energy problems*** *at one stroke*.
Elliott H. Lieb and Jakob Yngvason, The physics and mathematics of the second law of thermodynamics. Physics Reports 310, 1-96 (1999).



The possibility of solving ***the world's energy problems*** depends on the possibility of a process that is reverse of the process of dissipation of energy into heat.

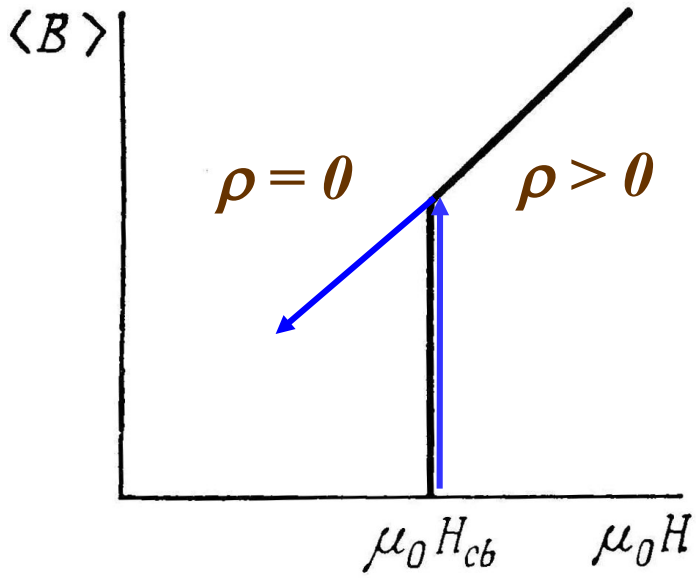
Physicists of the 20th century believed that Boltzmann's H-theorem proved the impossibility of such a process. Most of them did not know that the great scientist Max Planck questioned the validity of this theorem. Planck noted in his Scientific Autobiography that "*Boltzmann omitted in his deduction every mention of the indispensable presupposition of the validity of his theorem namely, the assumption of molecular disorder*".

For twenty-five years I am trying to convince the scientific community that the quantum phenomenon of the persistent current observed at a non-zero resistence, discovered in 1962, is experimental evidence of violation of the assumption of molecular disorder and thus the second law of thermodynamics. But only two years ago I realized that the Meissner effect, discovered in 1933, refuted the Second Law.



The superconductivity phenomenon was discovered in 1911 by Dutch physicist Heike Kamerlingh Onnes as perfect conductivity. A change in time of magnetic field $H = I$ created by electric current I in a solenoid induces the persistent current I_p in a thin surface layer $\lambda_L = (m/\mu_0 n_q q^2)^{1/2} \approx 50\ nm = 0.00005\ mm << r = 1\ mm$ of perfect conductor or superconductor.

The persistent current $I_p = -I$ does not allow the magnetic flux to penetrate inside superconductor $B = \mu_0(I + I_p) = 0$.



The magnetic flux penetrate inside the superconductor $B = \mu_0 H$ after its transition into the normal state at a critical magnetic field H_{cb} when the resistivity becomes non-zero $\rho > 0$ and the persistent current I_p is quickly damped with the generation of Joule heat.

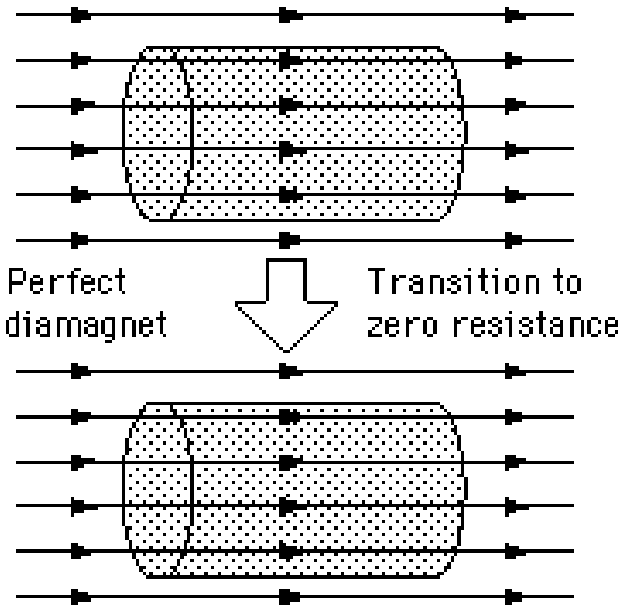
All physicists were sure before 1933 that the transition from superconducting to normal state in the magnetic field is irreversible because of the two reasons:

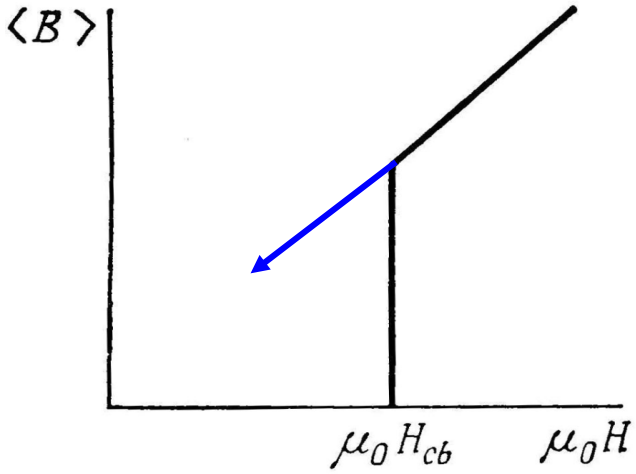
1) No electric current can appear at the opposite transition from $\rho > 0$ to $\rho = 0$ in the magnetic field H_{cb} constant in time $dH/dt = 0$ according such laws of physics as Faraday's law, Lenz's law and the law of angular momentum conservation.

2) The dissipation of the kinetic energy of the electric current into Joule heat, like the dissipation of the kinetic energy of a car into heat, is irreversible process according to the second law of thermodynamics.

Fundamental difference between perfect conductivity and superconductivity.

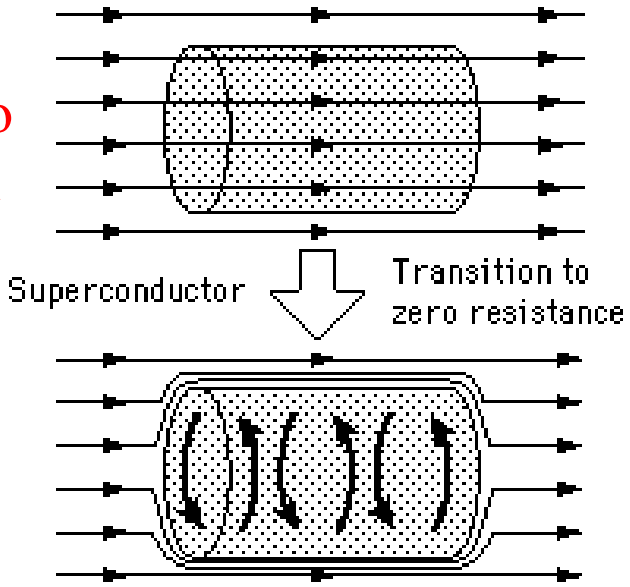
Perfect conductivity

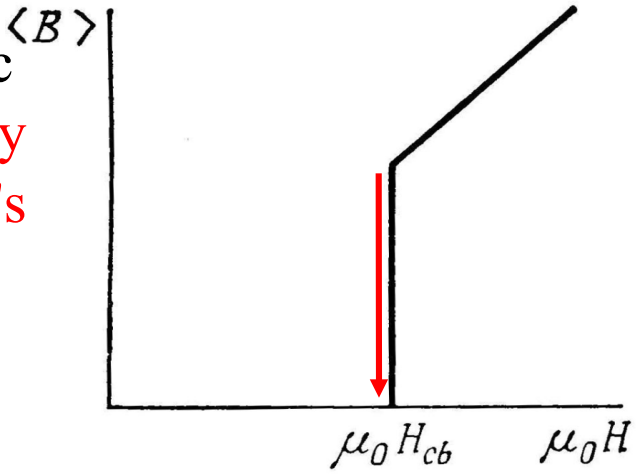




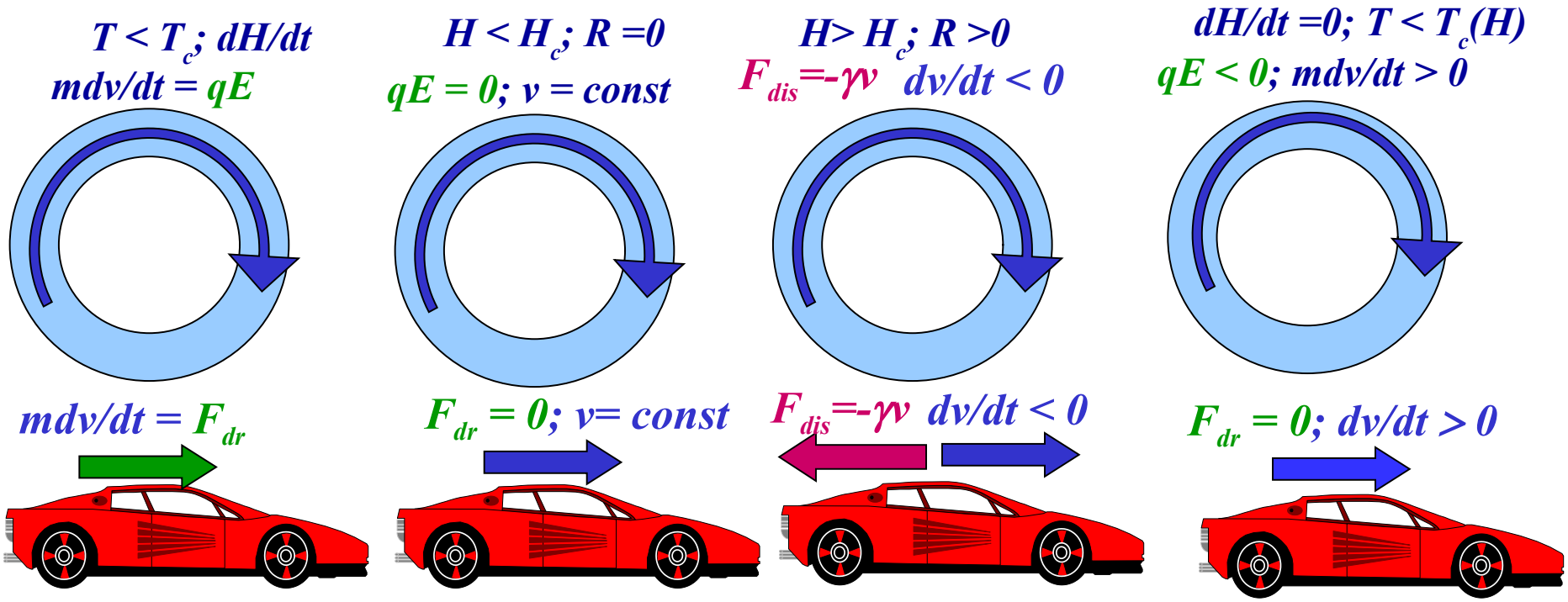
W. Meissner and R. Ochsenfeld discovered in 1933 exactly what is impossible according to the laws of physics and the second law of thermodynamics. They discovered that the persistent current pushes the magnetic flux out of a bulk superconductor in a time-constant magnetic field ***dH/dt = 0*** contrary to Faraday's law, Lenz's law and the law of angular momentum conservation.

Superconductivity





The contradiction with the second law of thermodynamics of the Meissner effect is especially obvious when compared with the movement of a car.



Mobile charge carriers in a superconductor and the car accelerates under the action of a driving force which makes a work in order to create the kinetic energy.

Mobile charge carriers and a car can move arbitrarily long in the absence of friction when the kinetic energy is not dissipated into heat.

The electric current and the car will quickly stop due to the dissipation of the kinetic energy into heat when friction occurs.

The Meissner effect. Electric current emerges without a driving force and heat energy is converted back into the kinetic energy of mobile charge carriers.

The emergence of the persistent screening current observed at the Meissner effect is analog to if a car began to move in the absence not only of a fuel but even of a driving force, and uphill. We cannot observe such a movement of the car. But we can observe the levitation of a magnet over a superconductor.

The potential energy of a magnet with macroscopic mass M increases by a macroscopic value gMh when it rises above the superconductor to a height h due to the Meissner effect. This energy is taken from heat, since when the superconductor returns to the normal state, the magnet, falling, induces Foucault's currents, which are damped with the generation of Joule heat.

Smoluchowski was proving in 1914 the impossibility of an useful perpetual motion machine by the statement that the potential energy of a Brownian particle cannot increase due to heat by an amount much greater than the thermal energy $k_B T$ per one particle.

The potential energy observed at the levitation is much larger the thermal energy $gMh >> k_BT$. Thus, the levitation because of the Meissner effect is direct evidence of a perpetual motion machine.

Most scientists are sure that a perpetual motion machine is impossible even when they observe it.

Blind faith in the impossibility of a perpetual motion machine forced physicists not only to forget some fundamental laws of physics, but also to postulate a contradiction with the law of energy conservation.

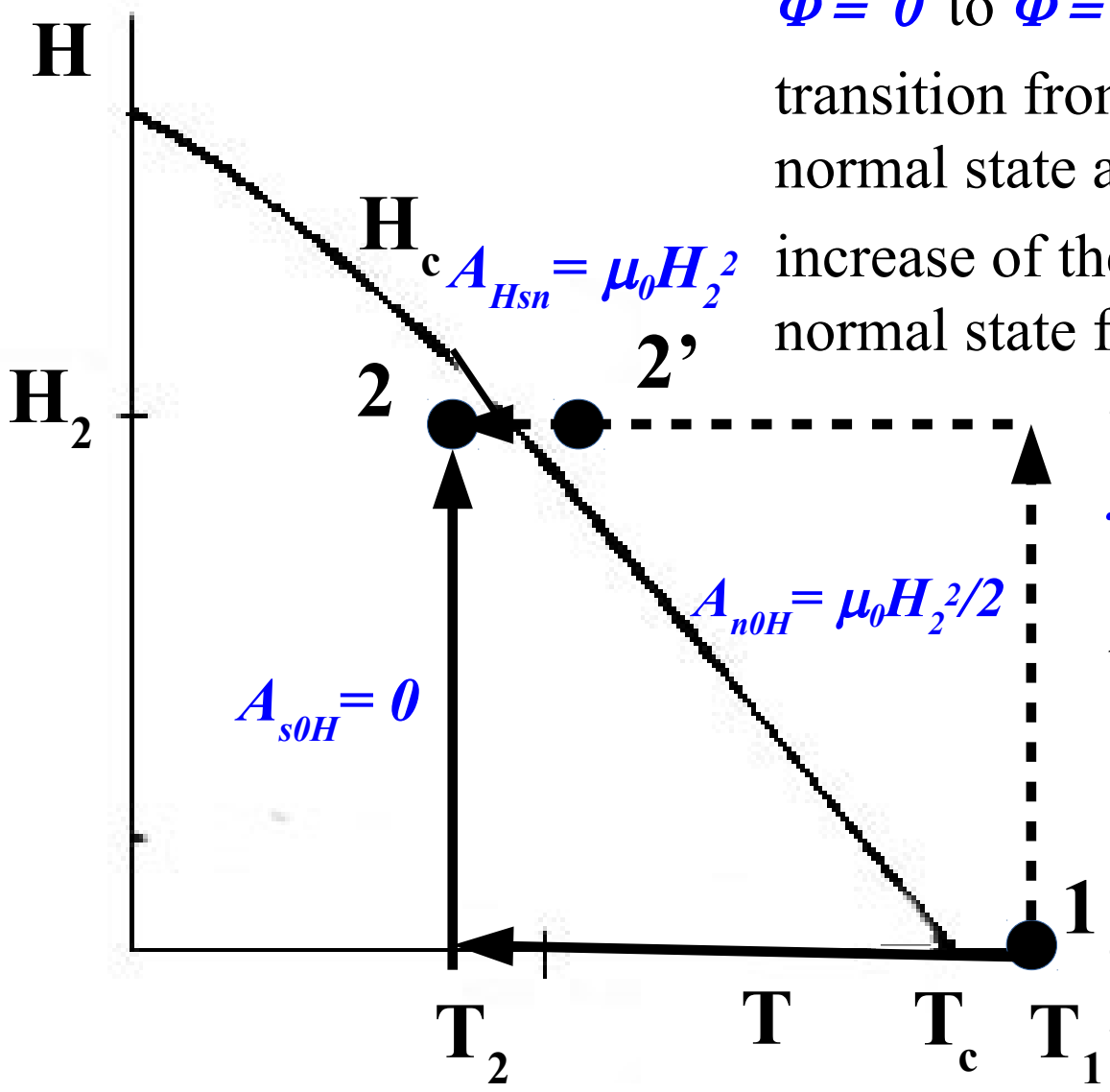
Physicists knew before 1933: 1) The power source should perform no work $A_{s0H} = 0$ in order to create the magnetic field $H = I$ inside superconductor; 2) At the transition of the superconductor in the normal state the power source should perform the amount of work

$$A_{Hsn} = \int_t dt\, IV = \int_t dt\, Id\Phi/dt = H\Phi$$

equal to twice the energy of the magnetic field in the normal state $\mu_0 H^2/2$: $H\Phi = \pi R^2 HB$ per unit length or $A_{Hsn} = HB = \mu_0 H^2$ per unit volume; 3) The half of this work is spent on creating the energy of magnetic field $\mu_0 H^2/2$ per unit volume while the second half of the work, the surplus work, is spent for the induction of Foucault's currents which dissipate in Joule heat.

The work $A_{s0H} = 0$ since magnetic flux Φ cannot penetrate in superconductor

$A_{s0H} = \int_t dt\, IV = \int_t dt\, Id\Phi/dt = 0$.



The magnetic flux increases from $\Phi = 0$ to $\Phi = \pi R^2 \mu_0 H_2$ both at the transition from superconducting to normal state at $H = H_2$ and at the increase of the magnetic field in the normal state from $H = 0$ to $H = H_2$.

The the amount of work $A = \int_t dt\, IV = \int_t dt\, Id\Phi/dt$ in the first case $A_{Hsn} = \mu_0 H_2^2$ equals to twice the work in the second case $A_{n0H} = \mu_0 H_2^2/2$ since the current of the solenoid $I = H$ does not change at $H = H_2$ and increases with H from $I = 0$.

Physicists knew also before 1933 that the work $A_{Hsn} = \mu_0 H^2$ increases the internal energy U on the amount equal to twice the energy of the magnetic field $U_n = U_s + \mu_0 H^2$. The free energy $F = U - ST$ increases on the half of this work

$$F_{nH} = F_{sH} + \mu_0 H_c^2/2$$

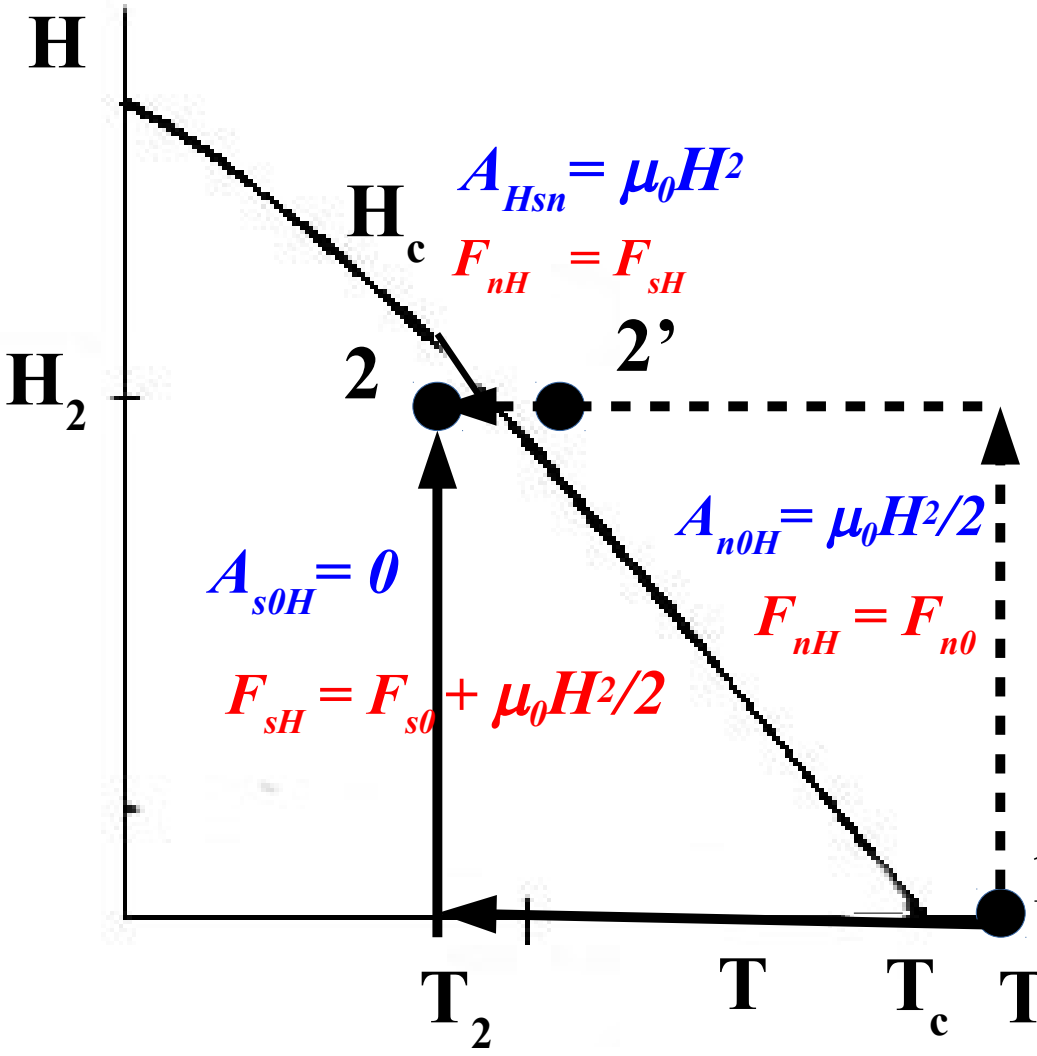
because of the increase of the heat energy $\Delta ST = \mu_0 H^2/2$ due to Joule heating. The transition of the superconductor in the normal state in the magnetic field H cannot be a reversible phase transition because of two reasons: 1) the free energy at the phase transition should be equal $F_{nH} = F_{sH}$ and 2) no Joule heat can be developed at the phase transition $\Delta ST = 0$.

But if this transition is irreversible process at which Joule heat $\Delta ST = \mu_0 H^2/2$ is developed than the Meissner effect is experimental evidence of the process reverse to the irreversible process impossible according to the second law of thermodynamics. Therefore, all superconductivity experts were convinced after 1933 that the superconducting transition is the phase transition. Only blind faith in the impossibility of a perpetual motion machine can explain the amazing fact that all (!!!) superconductivity experts have forgotten that **no work can be performed at the phase transition**.

In order the superconducting transition can be considered the phase transition superconductivity experts had to postulate the equalities

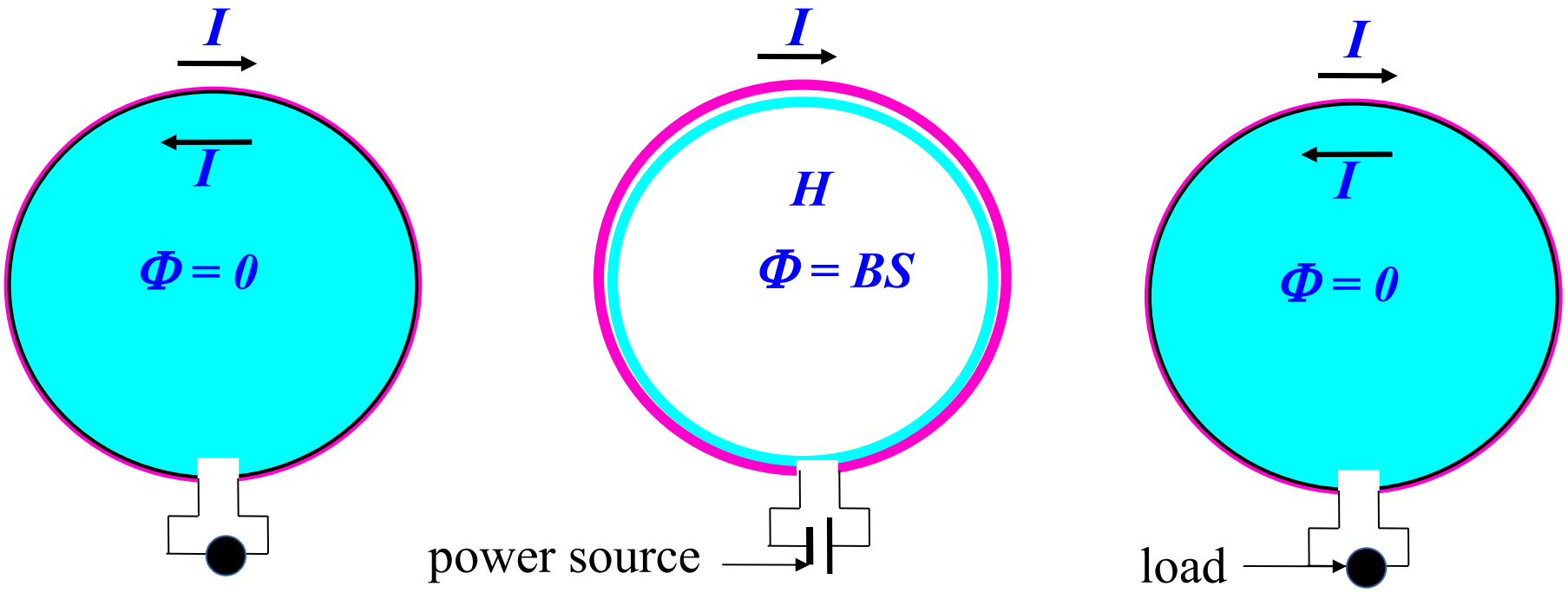
$$F_{nH} = F_{sH};\ F_{sH} = F_{s0} + \mu_0 H^2/2;\ F_{nH} = F_{n0}$$

which contradict to the law of energy conservation.



The equality of the free energy $F_{nH} = F_{sH}$ cannot be correct since the work $A_{Hsn} = \mu_0 H^2$ performed at the transition to normal state in the magnetic field increases the free energy $F_{nH} = F_{sH} + \mu_0 H_c^2/2$. The equalities $F_{sH} = F_{s0} + \mu_0 H^2/2$ and $F_{nH} = F_{n0}$ cannot be correct since the power source, creating the magnetic field H, performs work $A_{n0H} = \mu_0 H^2/2$ in the normal state rather than in the superconducting state.

The Meissner effect provoked the illusion of reversible transition since during the transition to the normal state, the magnetic flux inside the superconductor increases from zero $\Phi = 0$ to $\Phi = \pi R^2 \mu_0 H$ and decreases from $\Phi = \pi R^2 \mu_0 H$ to $\Phi = 0$ when returning to the superconducting state. The latter means that the Meissner effect allows to obtain the useful work $A_{Hns} = \mu_0 H^2$ in a load.



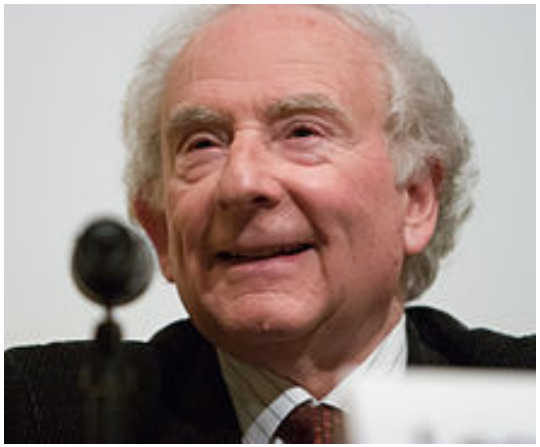
The half of this work is taken from the energy of the magnetic field $\mu_0 H_c^2/2$ while the second half $\mu_0 H_c^2/2$ can be taken only from heat, contrary to the second law of thermodynamics. It's funny that physicists forgot about Faraday's law!

The false faith in the impossibility of perpetual motion has led to a false understanding of the superconductivity phenomenon. The false equality

$$F_{n0} - F_{s0} = \mu_0 H_c^2/2$$

postulated on the basis of this false faith, is the basis for all theories of superconductivity. Theorists have tried to explain this equality since 1933.

John Bardeen



Leon Cooper

John Schrieffer

In 1972, the Nobel Prize was awarded for the BCS theory published in 1957, which explains this equality. John Bardeen, Leon Cooper and John Schrieffer created excellent theory. But this theory is based on the false confidence that superconducting transition is the phase transition. Nevertheless the BCS theory, like the Meissner effect, contradicts to the second law of thermodynamics.

Conclusion.

The mass delusion about the second law of thermodynamics and the theory of superconductivity became possible for the same reason as the mass delusion about quantum mechanics: "*Nowadays every Tom, Dick and Harry thinks he knows, but he is mistaken*".

Modern scientists lack skepticism about the cognitive abilities of our reason. They are insufficiently critical of generally accepted ideas about Nature and do not notice even obvious contradictions, for example between **living systems and the second law of thermodynamics**. Modern scientists need to be more critical of the opinion of the masses in order to understand that the perpetual motion machine is more real than a quantum computer.

Publications about a possibility of the perpetual motion machine

A.V. Nikulov, The law of entropy increase and the Meissner Effect. Entropy 24, 83 (2022); https://doi.org/10.3390/e24010083 .

A.V. Nikulov, Dynamic processes in superconductors and the laws of thermodynamics. Physica C 589, 1353934 (2021); https://doi.org/10.1016/j.physc.2021.1353934 .

Experimental evidence of the perpetual motion machine

V.L. Gurtovoi, V.N. Antonov, M. Exarchos, A.I. Il'in, A.V. Nikulov, The dc power observed on the half of asymmetric superconducting ring. Physica C 559, 14–20 (2019); https://doi.org/10.1016/j.physc.2019.01.009