THE POLITICS OF SCIENCE

Addressing Systemic Bias in STEM: Week 9

Content Warning: Anti-semitism, Nazism

1. IS SCIENCE APOLITICAL?
2. HOW DO POLITICS AND SCIENCE INTERACT?

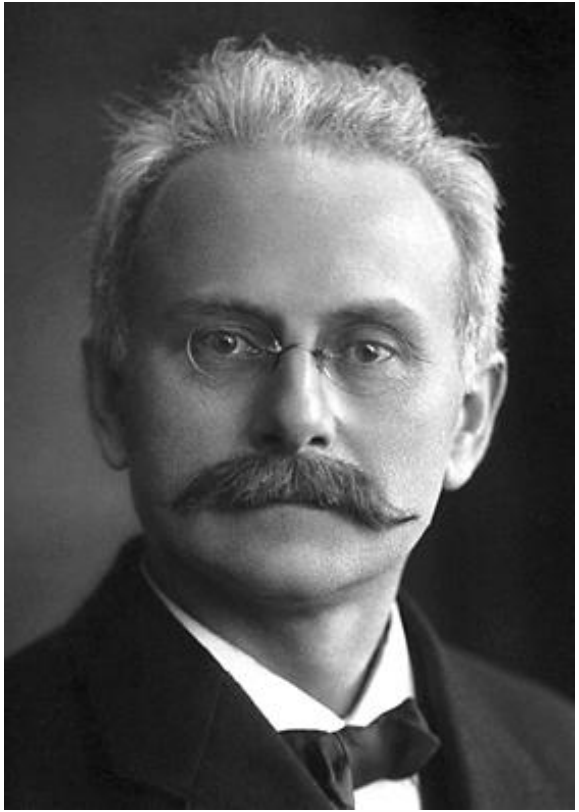
PHYSICS IN NAZI GERMANY

Collaborators? Resistors? Passive observers?

INTERVIEW WITH PHILIP BALL

JOHANNES STARK

- German-born physicist, best known for his discovery of the “Stark Effect”- how energy levels in an atom can shift with an applied electric field
- Nobel Laureate
- Early supporter of Hitler, main proponent of *“Deutsche Physik”,* sought to remove all “Jewish” influence from science
- Deemed anyone who defended Jewish scientists’ work (especially Einstein) “White Jews”

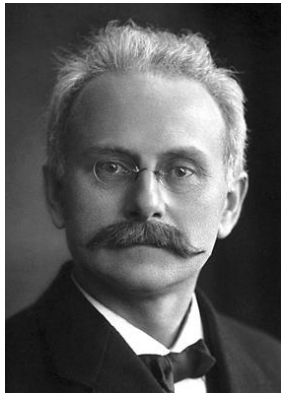


“DEUTSCHE PHYSIK”

THEORETICAL PHYSICS ⟷ JEWISH PHYSICS

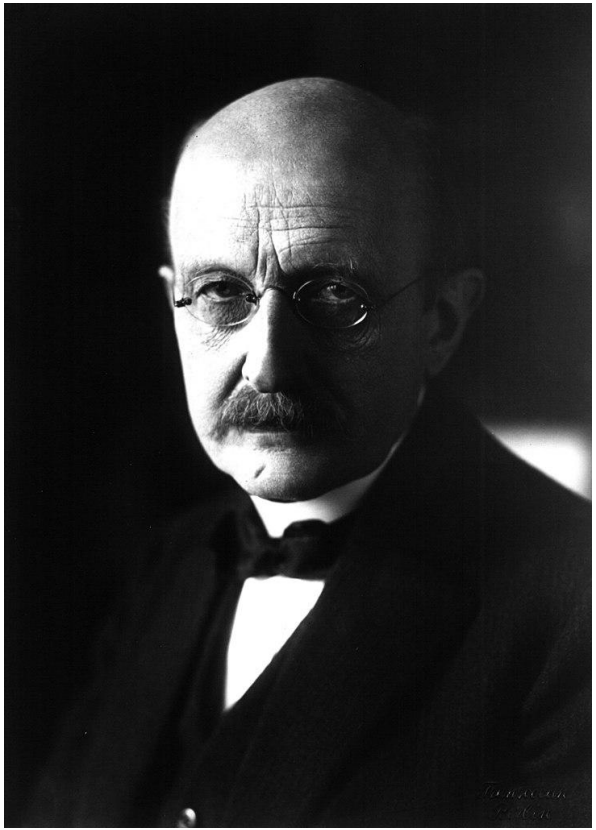
“Lacking the mathematical skills to cope with relativity and quantum theory, both of which Einstein pioneered, Lenard decided they were wrong and that their widespread acceptance and acclaim were the result of a pro-Jewish conspiracy.”

- Philip Ball, “Science and Ideology”



MAX PLANCK

- Theoretical physicist, best known for discovery of quantized nature of energy, which led to development of quantum mechanics
- Nobel Laureate
- A bridge between the old guard and the new generation of scientists, deeply traditional and “loyal to the German state + culture”
- “Paralyzed” by this loyalty when confronted with a brutal regime



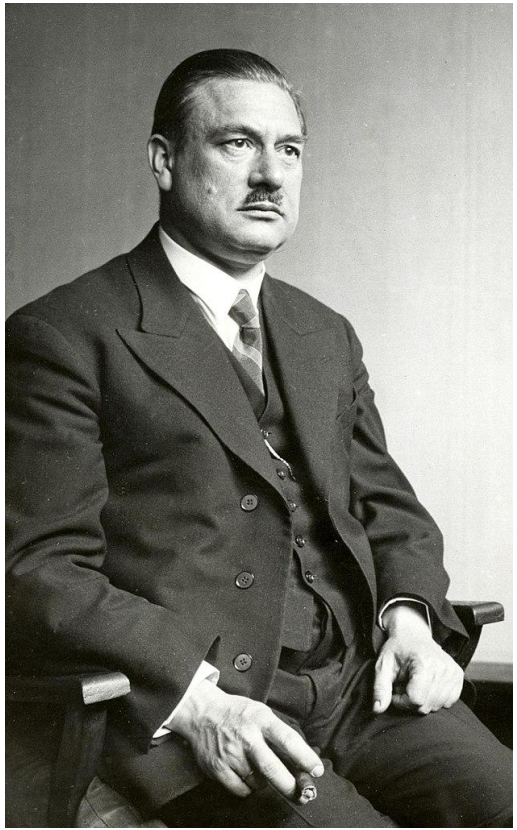
WHO WAS MAX PLANCK?

WERNER HEISENBERG

- Theoretical physicist, best known the early development of quantum mechanics (uncertainty principle, matrix mechanics)
- Nobel Laureate
- Defended Jewish colleagues (like Einstein) until he was reprimanded by Nazi government
- “Made science a refuge from moral dilemmas”
- Desperate for approval from scientific institution/ German culture he identified with

PETER DEBYE

- Dutch-American physicist/chemist
- Major contributions in solid-state physics + light/matter interactions
- Central figure of physics community in Germany, through most of the Third Reich
- Has come under scrutiny recently for his involvement with the Nazi regime; controversy over whether he was an active collaborator or active dissident
- Ball's take: he was uninterested in politics and "out of his moral depth"



"But you see, it's all terribly simple." - Peter Debye

"...the real problem for scientists in Germany in the 1930s was not a matter of personal shortcomings but the fact the institution of science itself had become an edifice lacking any clear social and moral orientation. It had created its own alibi for acting in the world."

PHILIP BALL, "SERVING THE REICH"

“SCIENCE AND IDEOLOGY: THE CASE OF PHYSICS IN NAZI GERMANY” BY PHILIP BALL

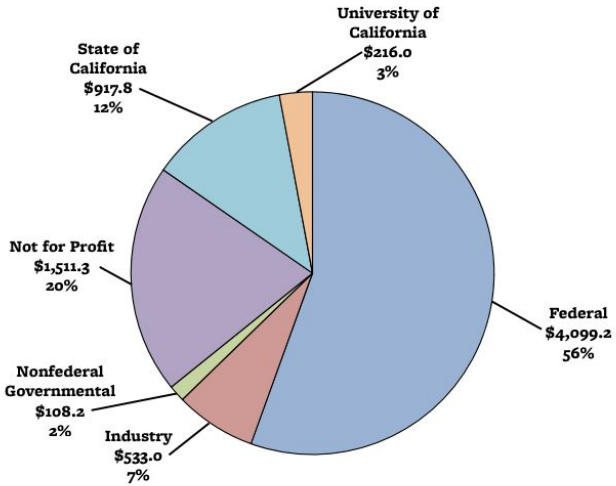
- What did you think of the article? Did you learn anything new, did anything surprise you? Were there points or conclusions you liked? Disagreed with?
- What lessons does Ball claim we can learn from German scientists under the Third Reich? Do you agree?
- Ball chooses to frame these men as neither good nor bad, focusing on how they interacted with the greater systemic issues of the time. Do you agree with this approach?

SCIENCE TODAY

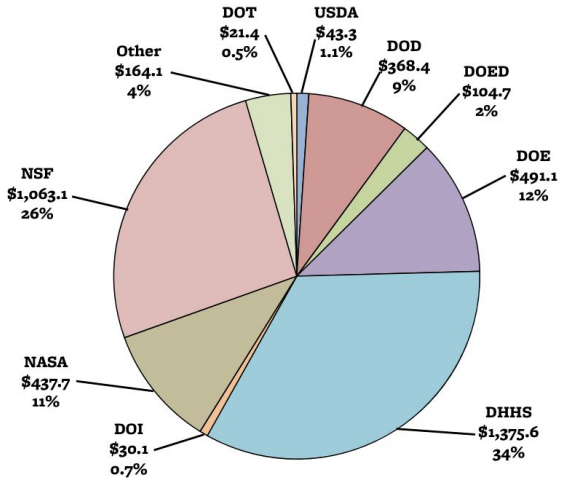
Funding + who dictates the direction of research?

RESEARCH FUNDING

Ten-Year Funding Summary - All Sponsors, FY 2011-2020
($7.39 billion total - dollars in millions)



Ten-Year Funding Summary - Federal Sponsors, FY 2011-2020
($4.10 billion total - dollars in millions)



https://spo.berkeley.edu/annual/20annual.pdf

https://www.aaas.org/programs/r-d-budget-and-policy/federal-rd-budget-dashboard

“SOCIAL RESPONSIBILITY FOR PHYSICS STUDENTS,” CHARLES L. SCHWARZ

Most students who enter physics do so because of the excitement and the challenge of the subject. There is the drawing power of the great names of the past -- like Galileo, Newton, Einstein -- and the dream that we may also make some great discoveries.

We hope that our achievements, won through hard work and creative thinking, will enlarge the scope of our fundamental understanding about the universe and everything in it, contribute in practical ways to better lives for all humanity, and lead to a rewarding career for ourselves.

But there is another side to this picture. It has to do with weapons of war, with death and destruction. The period since World War II has seen the greatest expansion of the profession of physics and the greatest proliferation of new discoveries. This period has also produced, largely resulting from the achievements of physicists, the greatest threat to human survival: the multinational race of armaments, both nuclear and conventional.

While the formal control over these weapons lies with the political and military leaders, we physicists cannot deny our portion of responsibility for this arms race. When one knowingly participates in preparations for war, especially nuclear war, it is morally inadequate to offer the defense, "I am just a technician; I am only following orders."

PHYSICS Graduates working at a job related to science & engineering:
To which area of national interest do you devote the most professional time ?

	Bachelors*	Masters*	Doctors**
Energy & Fuel	3%	3%	8%
Health	-	4%	3%
Environment	2%	-	1%
Education	10%	16%	27%
National Defense	48%	22%	32%
Agriculture	-	-	-
Mineral Resources	-	-	-
Community Devel. & Serv.	-	-	-
Housing	6%	-	-
Transportation	5%	3%	-
Communications	2%	7%	-
Technological Development	17%	25%	3%
Space	2%	8%	6%
Other	2%	5%	18%
No Answer	2%	7%	2%

*Data from NSF 1986 survey of graduates from 1983-85.
**Data from NSF 1987 survey of graduates from 1944-86.

"SOCIAL RESPONSIBILITY FOR PHYSICS STUDENTS," CHARLES L. SCHWARZ

Here are some results from a poll of science and engineering undergraduates at Cornell, conducted by some students there in 1988: [there were 546 respondents]

Scientists and engineers have a responsibility to be aware and informed about the arms race.
86% Agreed 4% Disagreed 6% Neutral

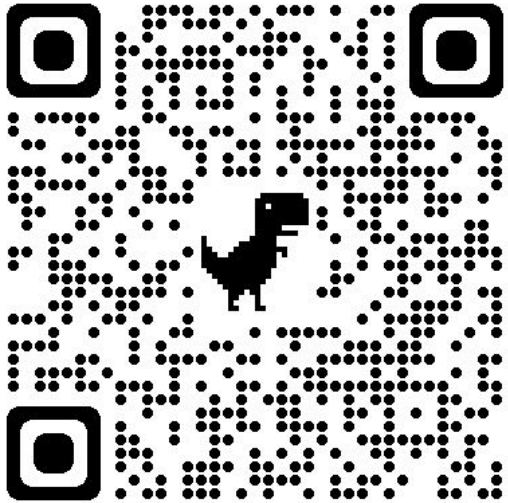
Would you be willing to work on a project with specifically military applications ?
5% Prefer 37% Willing 28% Reluctant 22% Not willing 8% Didn't matter

Are you currently informed as well as you would like to be on...
military/defense issues ? 33% Yes 67% No
environmental issues ? 26% Yes 74% No
energy/resource issues ? 26% Yes 74% No
biotechnology issues ? 21% Yes 79% No
the economic and social effects of technology ? 28% Yes 72% No

FUNDING SOURCES: GOVERNMENT VS. PRIVATE SECTOR

In small groups, discuss the pros and cons of research being funded by the government versus the private sector.

https://rb.gy/zd37qp



JAMBOARD

https://rb.gy/q5k5bz

COVID-19 VACCINES

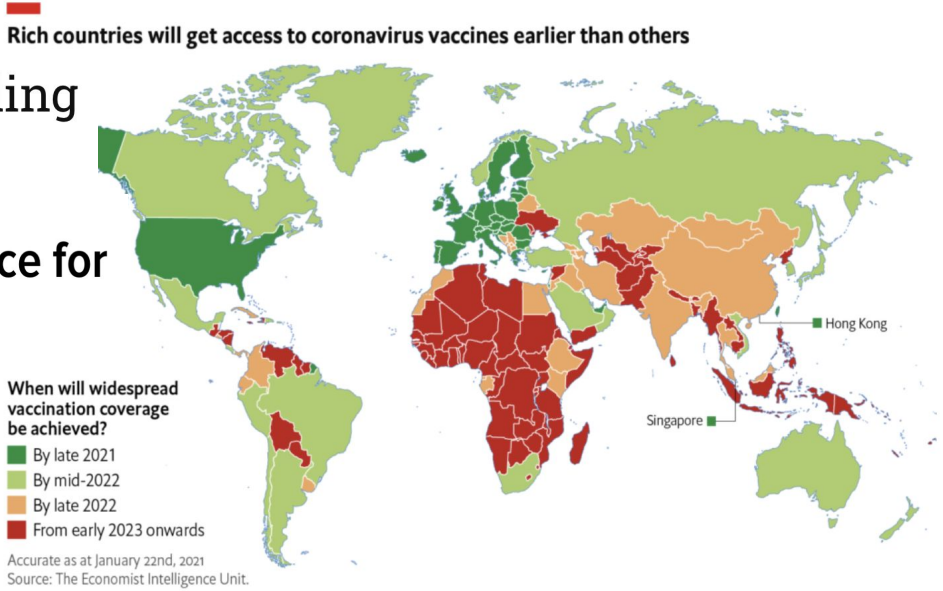
COVID-19

They Pledged to Donate Rights to Their COVID Vaccine, Then Sold Them to Pharma

Finnish Covid-19 vaccine preform yielding promising results but lacks funding

HEALTH

Stanford Scientists Post Entire mRNA Sequence for Moderna Vaccine on Github



"The purpose of science should be the general enhancement of life and not the causing of harm to man. I affirm that I will uphold this principle, in teaching and in practice of my science, to the best of my ability and judgement."

“A HIPPOCRATIC OATH FOR SCIENTISTS,” CHARLES L. SCHWARZ

SOURCES

Sources:

- “Science and Ideology: The Case of Physics in Nazi Germany,” by Philip Ball
- “Serving the Reich: Physics Under Hitler,” by Philip Ball
- Charles L. Schwartz’s writings: https://www.ocf.berkeley.edu/~schwrtz/SRS.html
- AAAS Federal R&D Budget Dashboard: https://www.aaas.org/programs/r-d-budget-and-policy/federal-rd-budget-dashboard
- UC Berkeley Sponsored Projects Annual Report (2020): https://spo.berkeley.edu/annual/20annual.pdf
- https://www.nature.com/articles/472030a