

L'intégrité scientifique

Marc Fermigier, laboratoire PMMH
Référent Intégrité Scientifique at ESPCI

Les 3 piliers d'une recherche scientifique et technique responsable

Ethique

Adéquation entre la recherche et la technologie et les valeurs culturelles et légales

Déontologie

Indépendance des pressions extérieures, absence de conflit d'intérêt

Intégrité Scientifique

L'intégrité scientifique est l'ensemble des valeurs et des règles qui garantissent une activité de recherche irréprochable. Elle est une condition sine qua non de la confiance entre collectifs de recherche et entre Science et Société. (définition HCERES)

Quand l'intégrité scientifique n'est plus au rendez vous ...

Plastic Fantastic

Les images sont des données comme les autres

« I believe it has some significance to our problem ... »

Bullshit vs Science

L'intégrité scientifique dans notre pratique

Plastic Fantastic

NEWS | BREAKTHROUGH OF THE YEAR

Science 21 Dec. 2001

Molecules Get Wired

Computer chip technology and scientific breakthroughs have been marching in step for decades. Without computers, scientists couldn't track climate change, sequence the genomes of entire organisms, or image the human brain at work. But the ability to cram ever more circuitry onto silicon chips now faces fundamental limits. Ironically, it's now possible to make the innards of a circuit—the transistors, resistors, capacitors, and wires—so small they no longer function.

In recent years, scientists have tried to get around these limits by going for the ultimate in shrinkage: turning single molecules and small chemical groups into transistors and other standard components of computer chips. It's a provocative idea, but many have doubted that researchers would ever manage to link such devices together into more complex circuits. Today, those doubts are diminishing. This year, researchers wired up their first molecular-scale circuits, a feat *Science* selects as the Breakthrough of 2001. If researchers can wire these circuits into intricate computer chip architectures, this new generation of molecular electronics will undoubtedly provide computing power to launch scientific breakthroughs for decades.

Finally, in a report published online by *Science* on 8 November, a group led by physicist Jan Hendrik Schön of Lucent Technologies' Bell Laboratories in Murray Hill, New Jersey, reported similar success in crafting circuits from transistors made from organic molecules that chemically assemble themselves between pairs of gold electrodes.

The « Bell labs » Murray Hill, New Jersey



Davisson, Germer : diffraction des électrons par un cristal, Nobel 1937

Nyquist 1934-1954

Shannon 1941-1972

Bardeen, Shockley, Brattain : invention du transistor Nobel, 1956

Anderson : localisation dans les milieux désordonnés, Nobel 1977

Penzias, Wilson : rayonnement cosmique fossile, Nobel 1978

Chu : atomes froids, Nobel 1997

Störmer, Laughlin, Tsui : effet Hall quantique fractionnaire, Nobel 1998

Boyle, Smith : capteur CCD, Nobel 2009

Betzig : microscopie superrésolue, Nobel 2014

Ashkin : pinces optiques, Nobel 2018

Publications de J.H. Schön et coauteurs 1998-2002

J. H. Schön; Ch. Kloc; R. Laudise; B. Batlogg (1998). "Electrical properties of single crystals of rigid rodlike conjugated molecules". *Physical Review B*. 58 (19): 12952–12957.

J. H. Schön; S. Berg; Ch. Kloc; B. Batlogg (2000). "Ambipolar Pentacene Field-Effect Transistors and Inverters". *Science*. 287 (5455): 1022–3.

J. H. Schön; Ch. Kloc; R. C. Haddon; B. Batlogg (2000). "A Superconducting Field-Effect Switch". *Science*. 288 (5466): 656–8.

J. H. Schön; Ch. Kloc; B. Batlogg (2000). "Fractional Quantum Hall Effect in Organic Molecular Semiconductors". *Science*. 288 (5475): 2338–40.

J. H. Schön; Ch. Kloc; A. Dodabalapur; B. Batlogg (2000). "An Organic Solid State Injection Laser". *Science*. 289 (5479): 599–601.

J. H. Schön; Ch. Kloc; B. Batlogg (2000). "A Light-Emitting Field-Effect Transistor". *Science*. 290 (5493): 963–6.

J. H. Schön; Ch. Kloc; B. Batlogg (2000). "Mobile iodine dopants in organic semiconductors". *Physical Review B*. 61 (16): 10803–10806.

J. H. Schön; C. Kloc; B. Batlogg (2000). "Perylene: A promising organic field-effect transistor material". *Applied Physics Letters*. 77 (23): 3776

J. H. Schön; Ch. Kloc; B. Batlogg (2000). "Superconductivity at 52 K in hole-doped C₆₀". *Nature*. 408 (6812): 549–52.

J. H. Schön; Ch. Kloc; B. Batlogg (2000). "Superconductivity in molecular crystals induced by charge injection". *Nature*. 406 (6797): 702–4.

J. H. Schön; Ch. Kloc; E. Bucher; B. Batlogg (2000). "Efficient organic photovoltaic diodes based on doped pentacene". *Nature*. 403 (6768): 408–10.

J. H. Schön; Ch. Kloc; H.Y. Hwang; B. Batlogg (2001). "Josephson Junctions with Tunable Weak Links". *Science*. 292 (5515): 252–4.

J. H. Schön; A. Dodabalapur; Ch. Kloc; B. Batlogg (2001). "High-Temperature Superconductivity in Lattice-Expanded C₆₀". *Science*. 293 (5539): 2432–4.

J. H. Schön; Ch. Kloc; A. Dodabalapur; B. Batlogg (2001). "Field-Effect Modulation of the Conductance of Single Molecules". *Science*. 294 (5549): 2138–40.

J. H. Schön; Ch. Kloc; D. Fichou; B. Batlogg (2001). "Conjugation length dependence of the charge transport in oligothiophene single crystals". *Physical Review B*. 64 (3): 035209.

J. H. Schön; Ch. Kloc; B. Batlogg (2001). "Low-temperature transport in high-mobility polycrystalline pentacene field-effect transistors". *Physical Review B*. 63 (12): 125304.

J. H. Schön; Ch. Kloc; B. Batlogg (2001). "Hole transport in pentacene single crystals". *Physical Review B*. 63 (24): 245201

J. H. Schön; Ch. Kloc; B. Batlogg (2001). "Universal Crossover from Band to Hopping Conduction in Molecular Organic Semiconductors". *Physical Review Letters*. 86 (17): 3843–6

J. H. Schön; C. Kloc (2001). "Fast organic electronic circuits based on ambipolar pentacene field-effect transistors". *Applied Physics Letters*. 79 (24): 4043.

J. H. Schön (2001). "Plastic Josephson junctions". *Applied Physics Letters*. 79 (4): 2208–2210.

J. H. Schön; M. Dorget; F. C. Beuran; X. Z. Zu; E. Arushanov; C. Deville Cavellin; M. Laguës (2001). "Superconductivity in CaCuO₂ as a result of field-effect doping". *Nature*. 414 (6862): 434–6.

J. H. Schön; M. Dorget; F. C. Beuran; X. Z. Xu; E. Arushanov; M. Laguës; C. Deville Cavellin (2001). "Field-Induced Superconductivity in a Spin-Ladder Cuprate". *Science*. 293 (5539): 2430–2.

J. H. Schön; Ch. Kloc; T. Siegrist; M. Steigerwald; C. Svensson; B. Batlogg (2001). "Superconductivity in single crystals of the fullerene C₇₀". *Nature*. 413 (6858): 831–3.

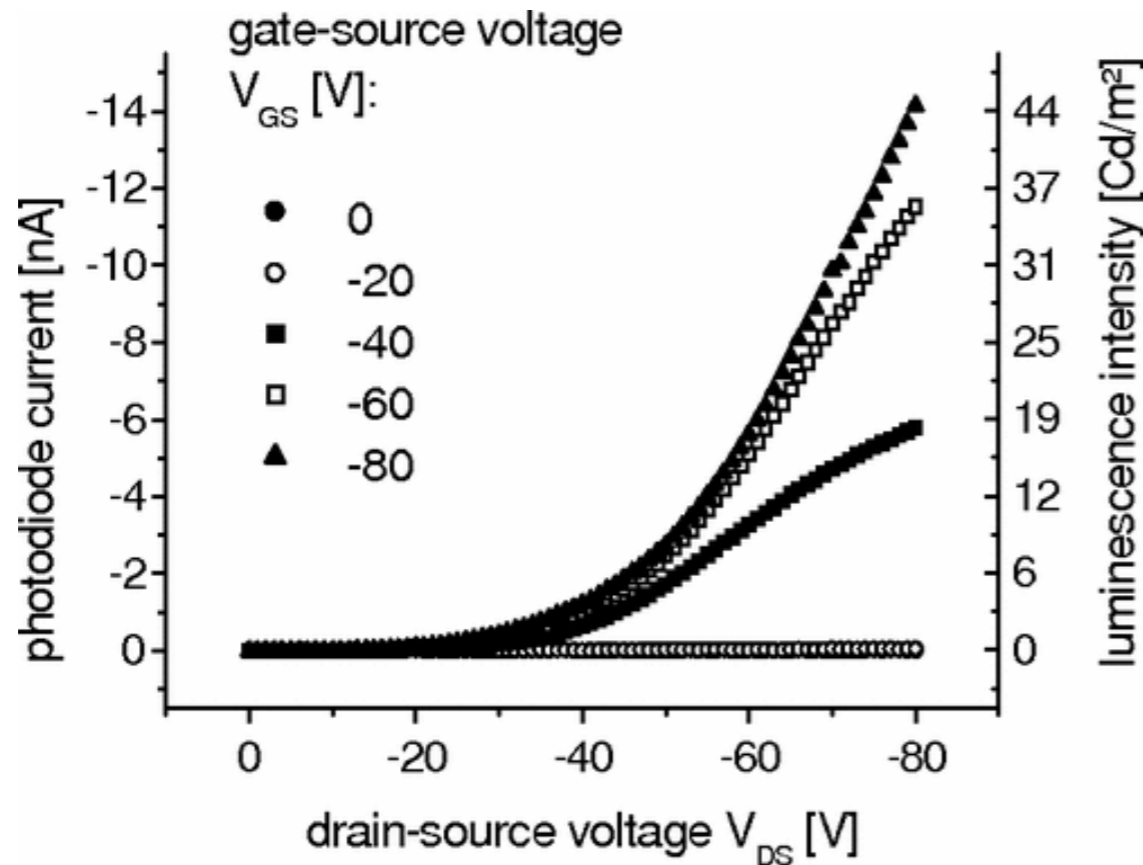
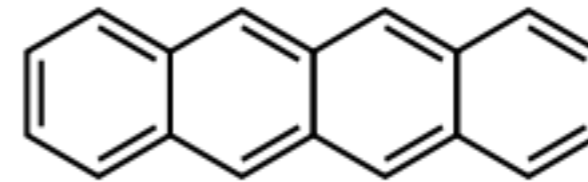
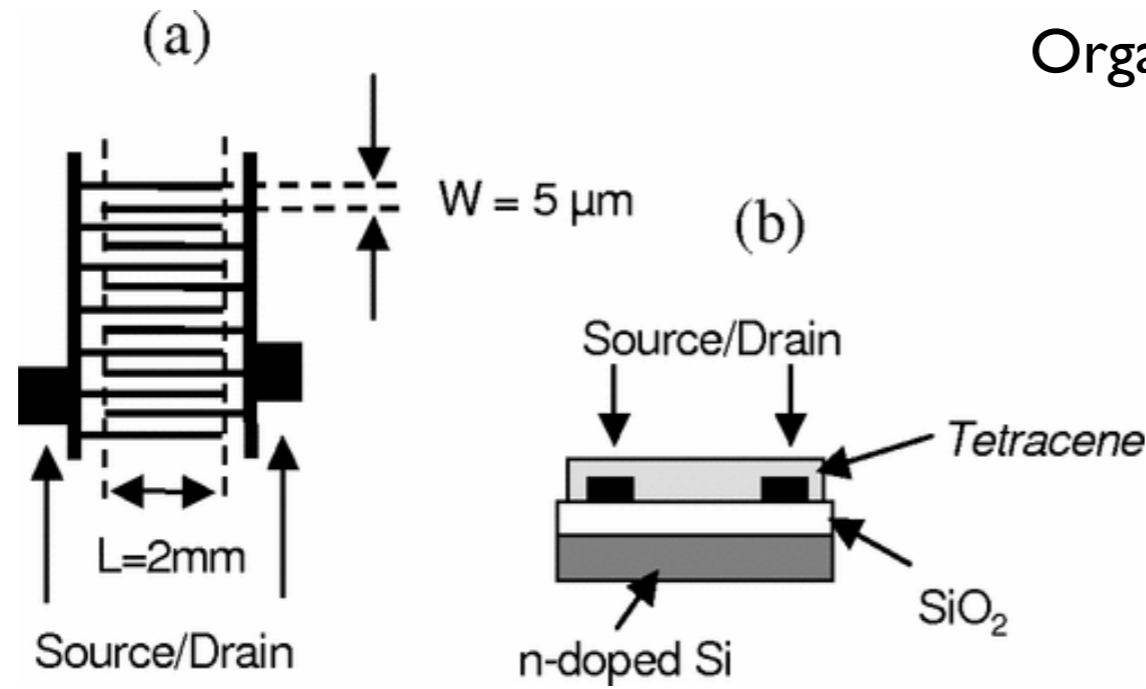
J. H. Schön; H. Meng; Z. Bao (2001). "Self-assembled monolayer organic field-effect transistors". *Nature*. 413 (6857): 713–6.

J. H. Schön; A. Dodabalapur; Z. Bao; Ch. Kloc; O. Schenker; B. Batlogg (2001). "Gate-induced superconductivity in a solution-processed organic polymer film". *Nature*. 410 (6825): 189–92.

J. H. Schön; Z. Bao (2002). "Nanoscale organic transistors based on self-assembled monolayers". *Applied Physics Letters*. 80 (5): 847.

J. H. Schön; H. Meng; Z. Bao (2002). "Self-Assembled Monolayer Transistors". *Advanced Materials*. 14 (4): 323–326.

Organic- Light Emitting Field Effect Transistor O-LEFT



Light-Emitting Field-Effect Transistor Based on a Tetracene Thin Film

Aline Hepp, Holger Heil, Wieland Weise, Marcus Ahles, Roland Schmechel, and Heinz von Seggern

Phys. Rev. Lett. 91, 157406 (2003)

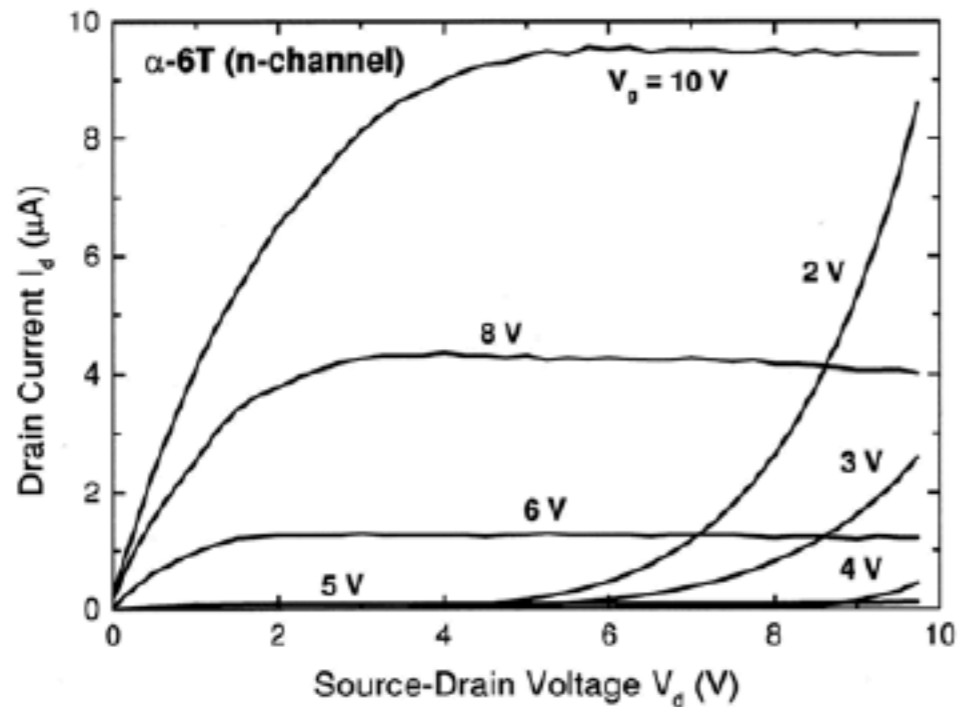


Figure 7. Triode characteristic from "LightEmitting" Paper (V), Fig. 1.: "alpha-sexithiophene (α -6T)"

Schön et al., Light-emitting field-effect transistor, Science 290, 963 (2000)

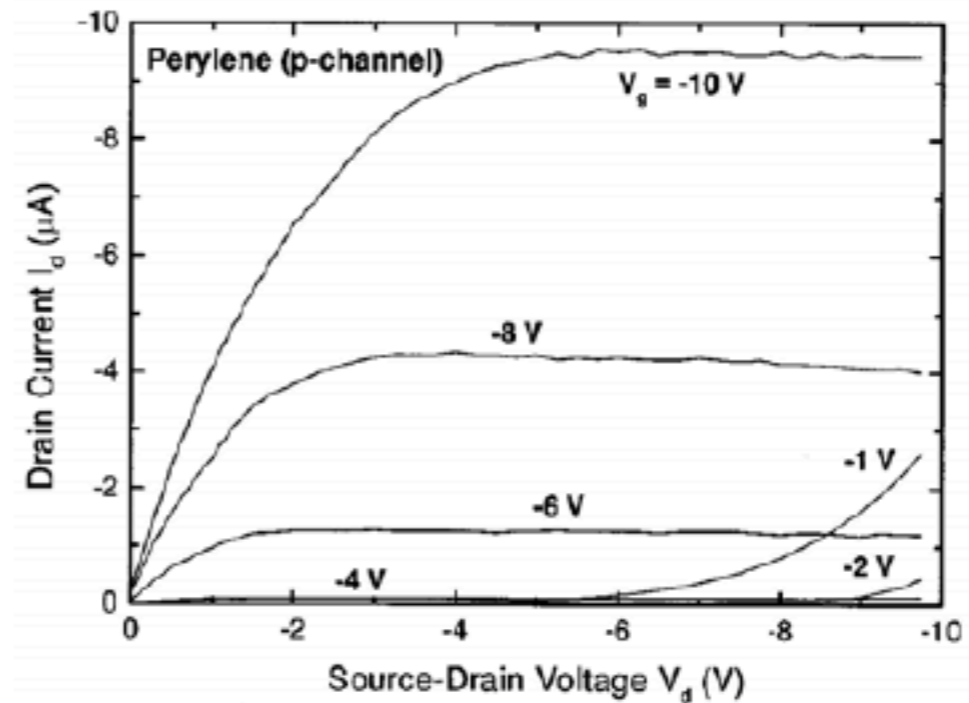


Figure 8. Triode characteristic from "Perylene" (VI), Fig. 2: "perylene". Note the sign change from Figure 7. One curve is missing.

Schön et al., Perylene, a promising field-effect transistor material, Applied Physics Letters 77, 3776 (2000)

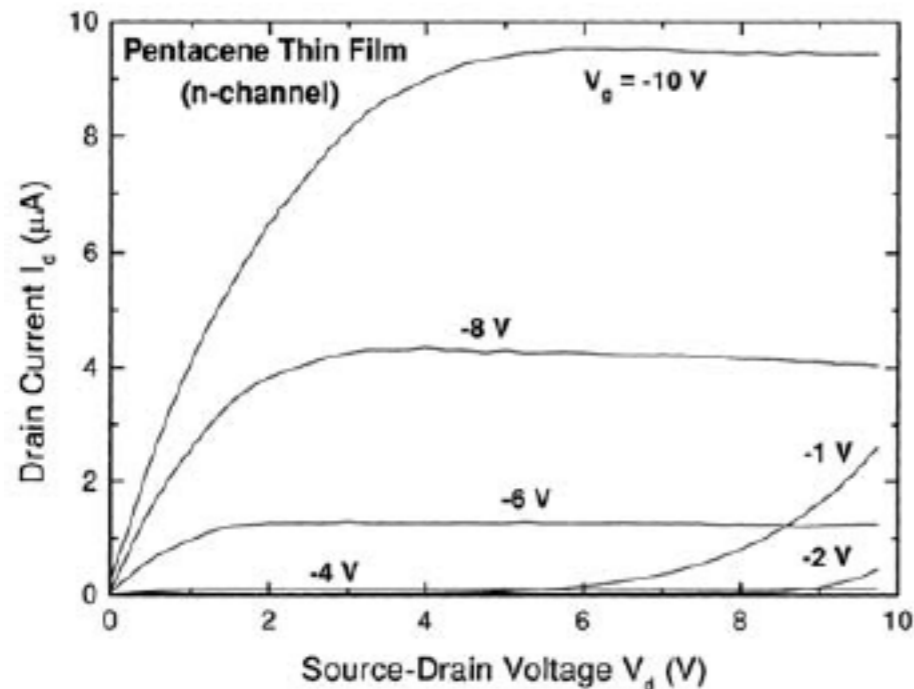


Figure 9. Triode characteristic from Paper (VIII), "AmbipolarOrganic", Fig. 2: "pentacene."

Schön et al., Ambipolar organic devices for complementary logic, Synthetic Metals 122, 195 (2001)

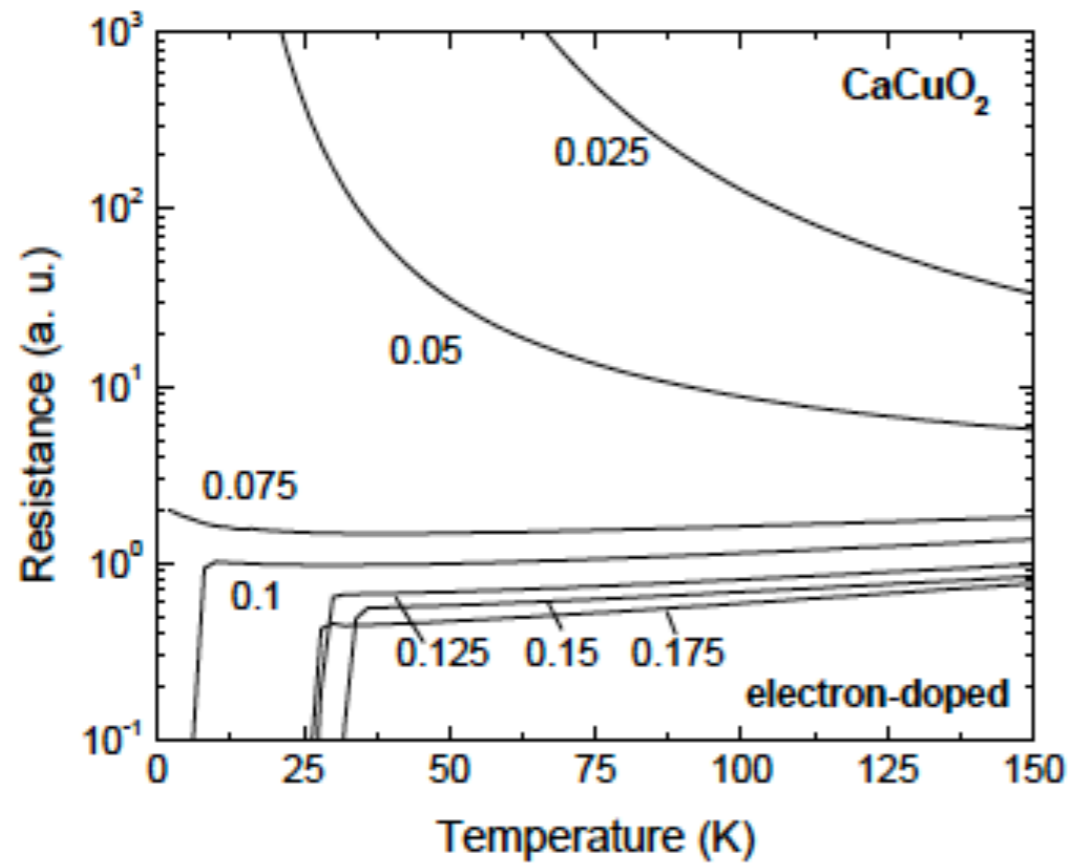


Figure 37. Resistivity data for electron-doped CaCuO_2 for various "electron doping levels," from Figure 3 of Paper XXI ("FETCaCuO2").

Schön et al., Superconductivity in CaCuO_2 as a result of field-effect doping, Nature 414, 6862 (2001)

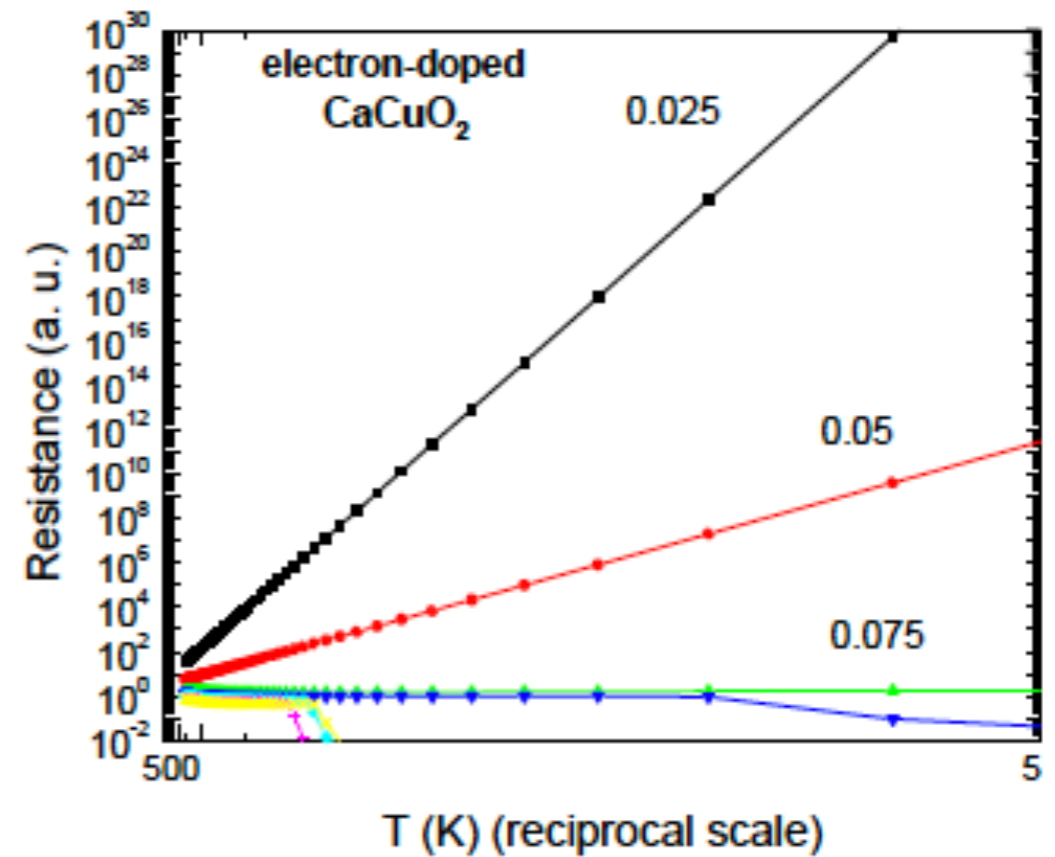


Figure 39. Resistivity data from Figure 37 (extracted from electronic draft), replotted on an Arrhenius plot to emphasize the insulating regime of gate voltage. The reported resistivity follows an activated behavior over more than 25 decades.

- J. H. Schön; Ch. Kloc; R. Laudise; B. Batlogg (1998). "Electrical properties of single crystals of rigid rodlike conjugated molecules". *Physical Review B*. 58 (19): 12952–12957.
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- J. H. Schön; Ch. Kloc; A. Dodabalapur; B. Batlogg (2000). "An Organic Solid State Injection Laser". *Science*. 289 (5479): 599–601.
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- J. H. Schön; C. Kloc; B. Batlogg (2000). "Perylene: A promising organic field-effect transistor material". *Applied Physics Letters*. 77 (24): 3776–78.
- J. H. Schön; Ch. Kloc; B. Batlogg (2000). "Superconductivity at 52 K in hole-doped C₆₀". *Nature*. 408 (6805): 549–52.
- J. H. Schön; Ch. Kloc; B. Batlogg (2000). "Superconductivity in molecular crystals induced by charge injection". *Nature*. 407 (6807): 701–4.
- J. H. Schön; Ch. Kloc; E. Bucher; B. Batlogg (2000). "Efficient organic photovoltaic diodes based on doped perylene". *Nature*. 407 (6807): 408–10.
- J. H. Schön; Ch. Kloc; H.Y. Hwang; B. Batlogg (2001). "Josephson Junctions with Tunable Weak Links". *Science*. 292 (5522): 1052–4.
- J. H. Schön; A. Dodabalapur; Ch. Kloc; B. Batlogg (2001). "High-Temperature Superconductivity in Lattice-Extended C₆₀". *Science*. 293 (5539): 2432–4.
- J. H. Schön; Ch. Kloc; A. Dodabalapur; B. Batlogg (2001). "Field-Effect Modulation of the Conductance of Single Molecules". *Science*. 294 (5549): 2138–40.
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- J. H. Schön; C. Kloc (2001). "Fast organic electronic circuits based on ambipolar pentacene field-effect transistors". *Applied Physics Letters*. 79 (24): 4043.
- J. H. Schön (2001). "Plastic Josephson junctions". *Applied Physics Letters*. 79 (4): 520–210.
- J. H. Schön; M. Dorget; F. C. Beuran; X. Z. Zu; E. Arushanov; C. Deville Cavellin; M. Laguès (2001). "Superconductivity in CaCuO₂ as a result of field-effect doping". *Nature*. 414 (6862): 434–6.
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- J. H. Schön; A. Dodabalapur; C. Kloc; H. Meng; C. Kloc; O. S. S. Baker; B. Batlogg (2001). "Gate-induced superconductivity in a solution-processed organic polymer film". *Nature*. 410 (6825): 189–92.
- J. H. Schön; Z. Bao (2001). "Nanoscale Organic Transistors based on self-assembled monolayers". *Applied Physics Letters*. 80 (5): 847.
- J. H. Schön; H. Meng; C. Kloc (2002). "Self-Assembled Monolayer Transistors". *Advanced Materials*. 14 (4): 323–326.

Physicist Fired for Falsified Data

By **Robert F. Service** | Sep. 25, 2002 , 12:00 AM

Jan Hendrik Schön, a Bell Labs physicist whose papers promised to revolutionize the fields of organic electronics, superconductivity, and nanotechnology, fabricated data and falsified reports from 1998 through 2001, according to a report released today by a committee of independent investigators. Schön was fired from Bell Labs Tuesday night, shortly after officials there received the report. The findings mark this as one of the most extensive cases of scientific misconduct in modern history.

Pour en savoir plus :

« Plastic Fantastic », Eugenie Samuel Reich, Palgrave Macmillan 2009
Report of the investigation committee, Lucent Technologies, 2002

L'affaire Voinnet/Dunoyer

Olivier Voinnet

Ingénieur

AgroParisTech 1996

Doctorat Norwich Univ. 2001

CNRS chargé de recherches Strasbourg 2002

CNRS médaille de bronze 2004

CNRS directeur de recherches Strasbourg 2005

CNRS médaille d'argent 2007

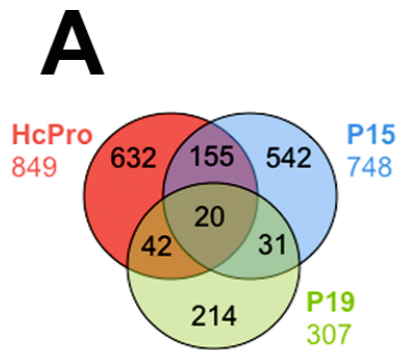
EMBO gold medal 2009

Professeur de biologie ETH Zürich 2010

Académie des Sciences 2014

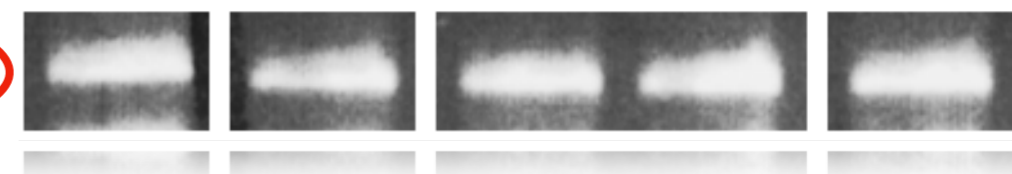
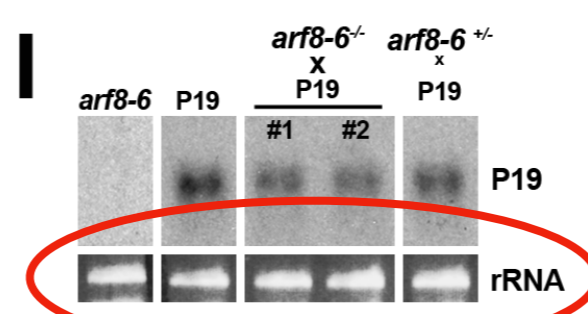
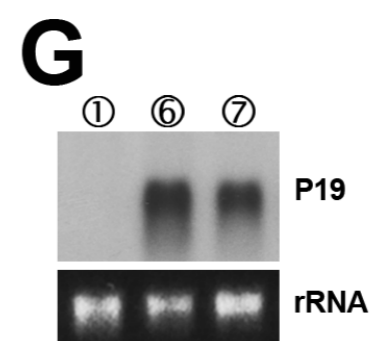
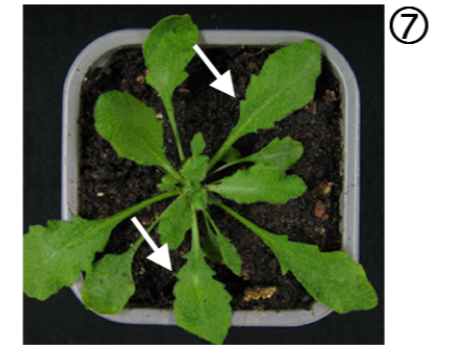
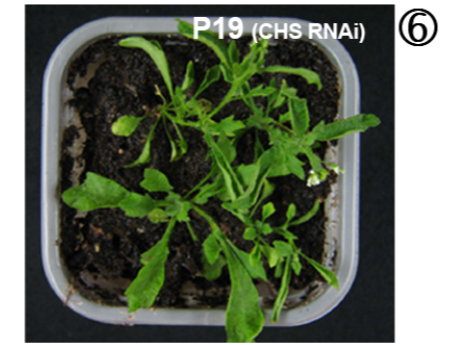
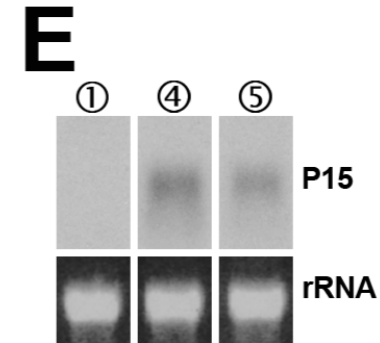
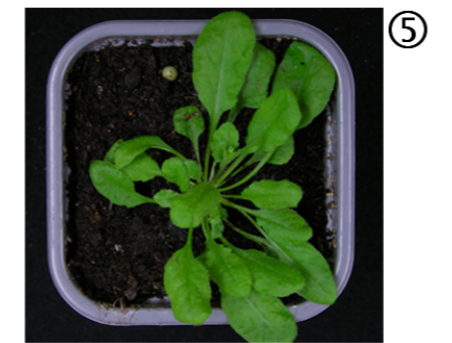
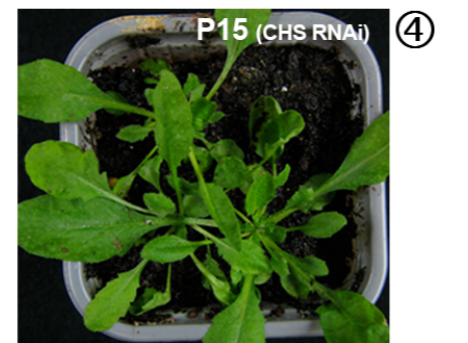
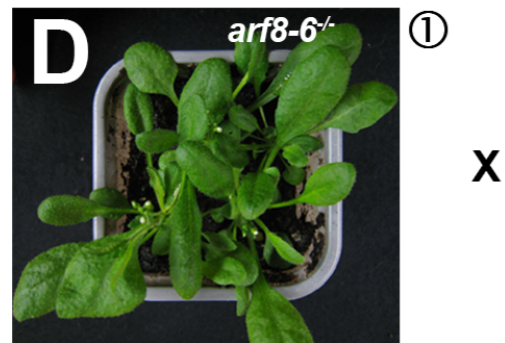
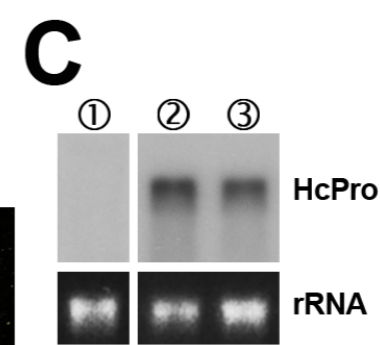
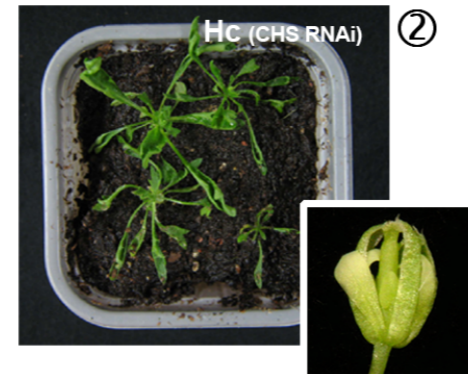
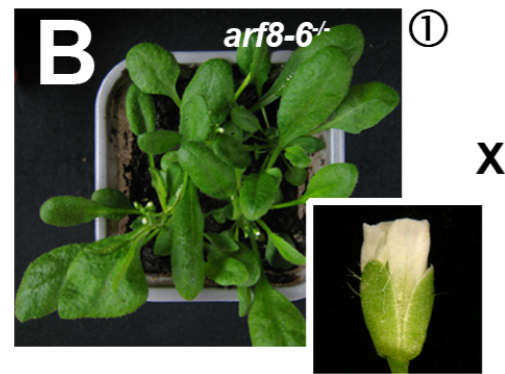
2015 : commentaire sur le site [PubPeer](#) concernant une manipulation d'image dans les publications du groupe de Voinnet

FACTOR 8 Underlies the Developmental Abnormalities Caused by Three Distinct Viral Silencing Suppressors in Arabidopsis

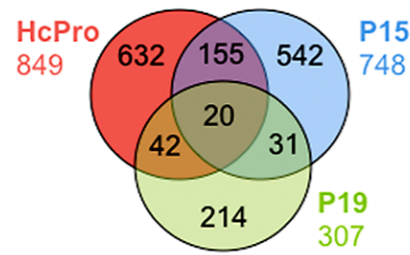


AT5G37020	auxin-responsive factor (ARF8)	miR167
AT5G60450	auxin-responsive factor (ARF4)	TAS3
AT1G08830	copper/zinc superoxide dismutase (CSD1)	miR398
AT2G22840	growth regulating factor (GRF1)	miR396
AT3G57230	MADS-box protein (AGL16)	miR824
AT4G03190	F-box family protein (AFB1)	miR393

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 + *dcl1-9*
 + *hen1-1*

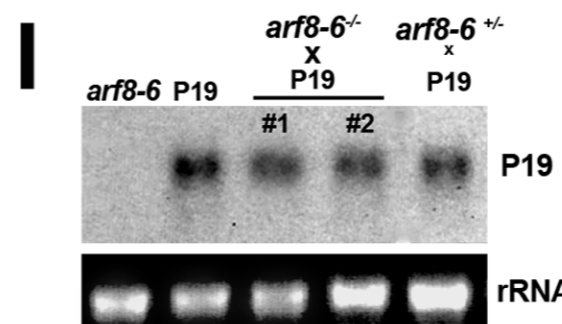
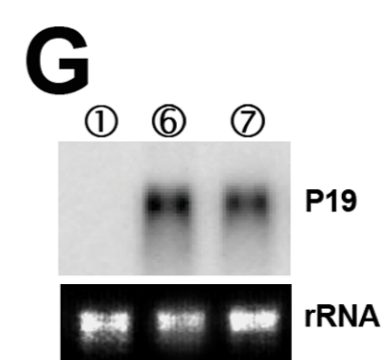
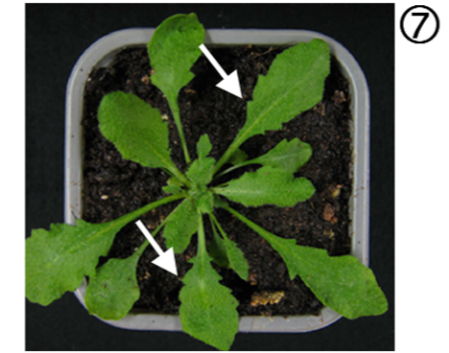
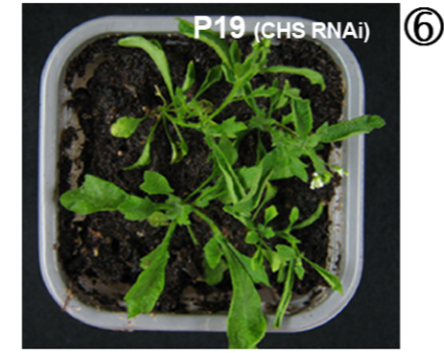
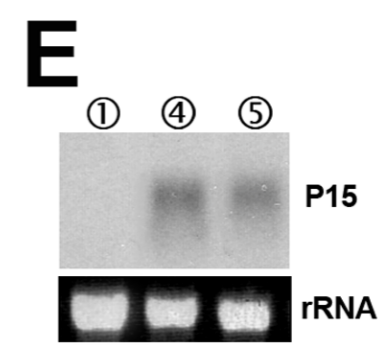
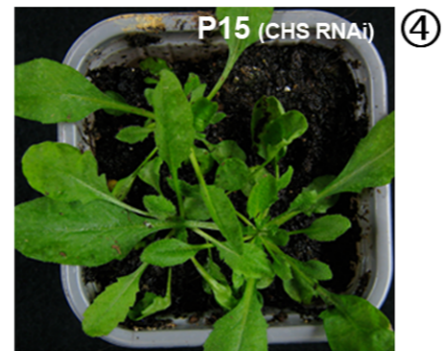
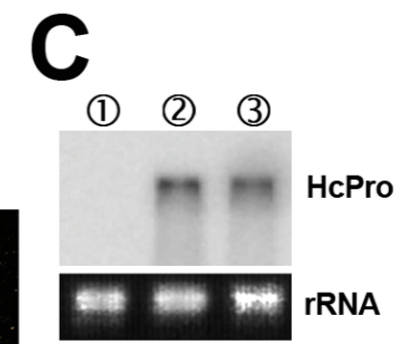
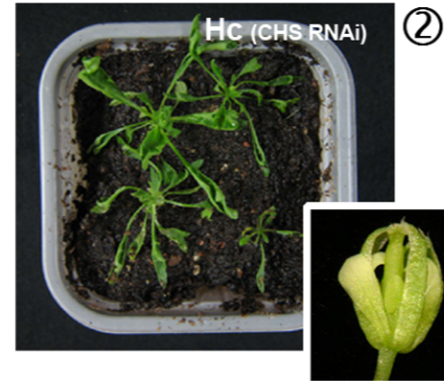
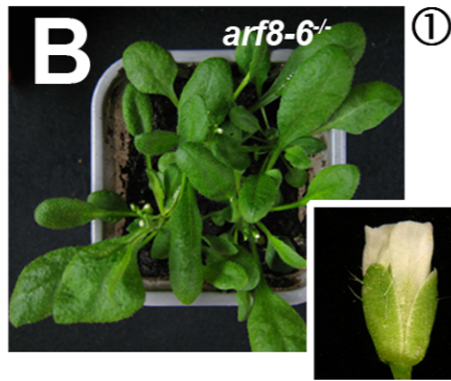


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3 VSR
+ *dcl1-9*
+ *hen1-1* } 3 VSR
+ *dcl1-9* } 3 VSRs



Images de contrôle corrigées

Enquêtes sur l'affaire Voinnet/Dunoyer

Enquêtes menées par l'ETH Zürich

OV n'est pas coupable d'une méconduite scientifique majeure en dépit d'une manipulation d'images par ses coauteurs

ETHZ recommande la rétraction de 4 articles et la correction de 3 autres

Les conclusions scientifiques ne sont néanmoins pas mises en cause

OV reçoit un avertissement et l'ETH réorganise le laboratoire

Enquêtes menées par le CNRS

OV est suspendu 2 ans par le CNRS

P. Dunoyer est suspendu 1 an

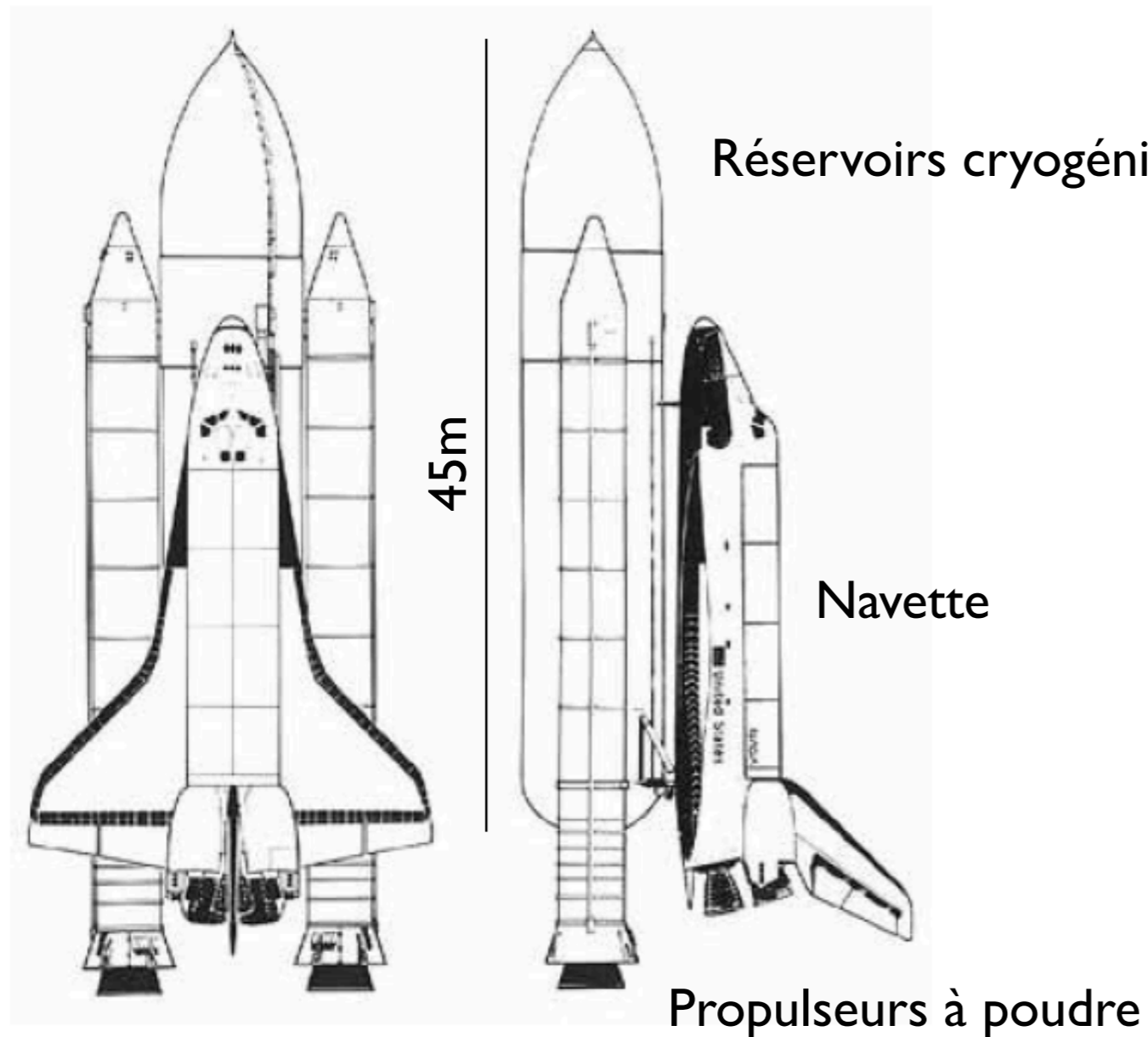
Extrait du rapport de l'ETH Zürich :

« He (O.Voinnet) responded by giving insights into the way his lab was run with each individual researcher **being subjected to considerable pressure and only having occasional chances (approx. once in six months) to present his/her data at lab meetings.**

The picture that emerged was one of an exciting but high-pressure environment at the forefront of science and where the lab was in strong competition with other laboratories....

OV admitted that **many papers were assembled too quickly, with “no moment of reflection”**, in a highly competitive environment. »

I believe it has some significance to our problem ...



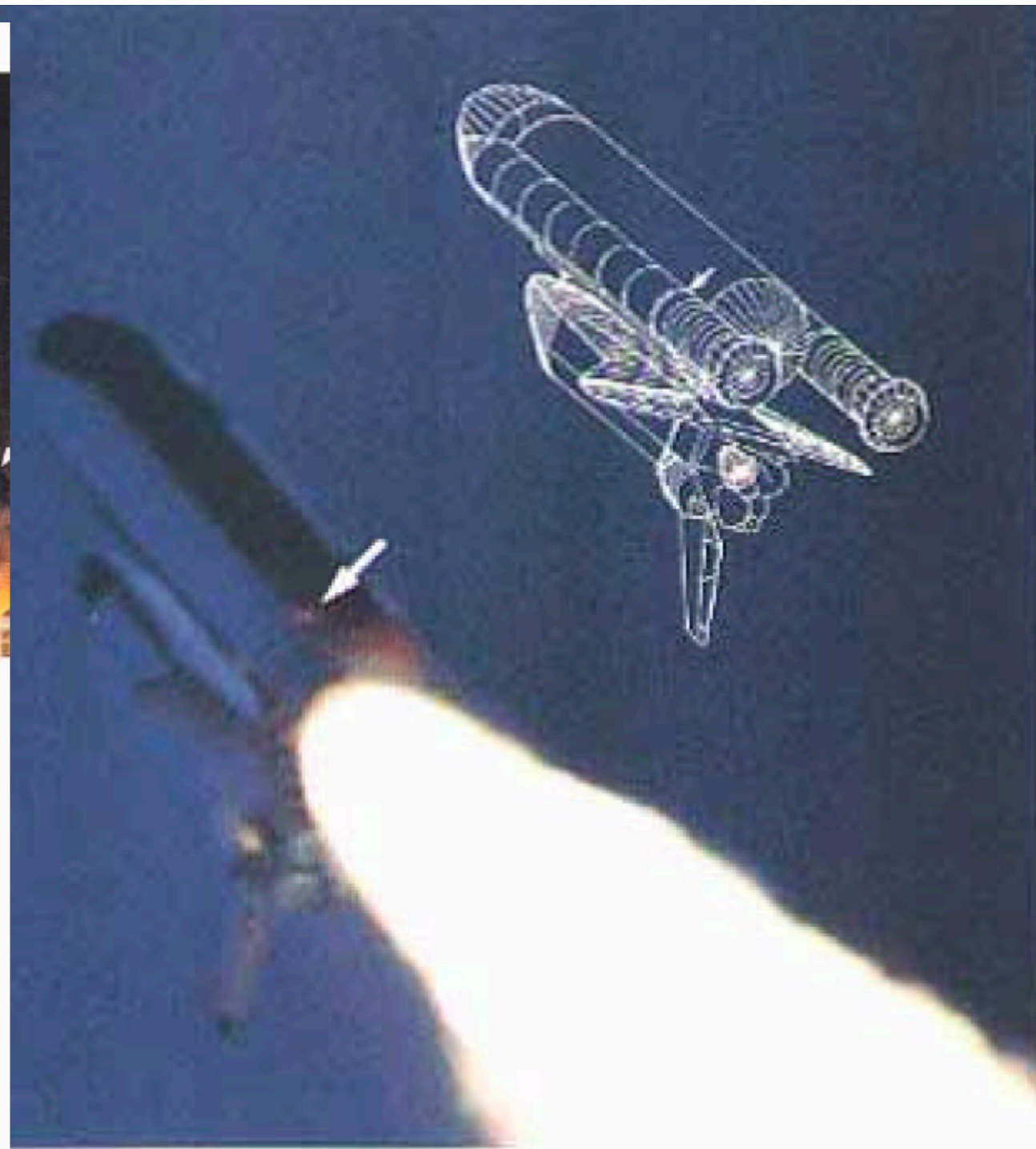
28 Janvier 1986

25^{ème} vol de la navette spatiale

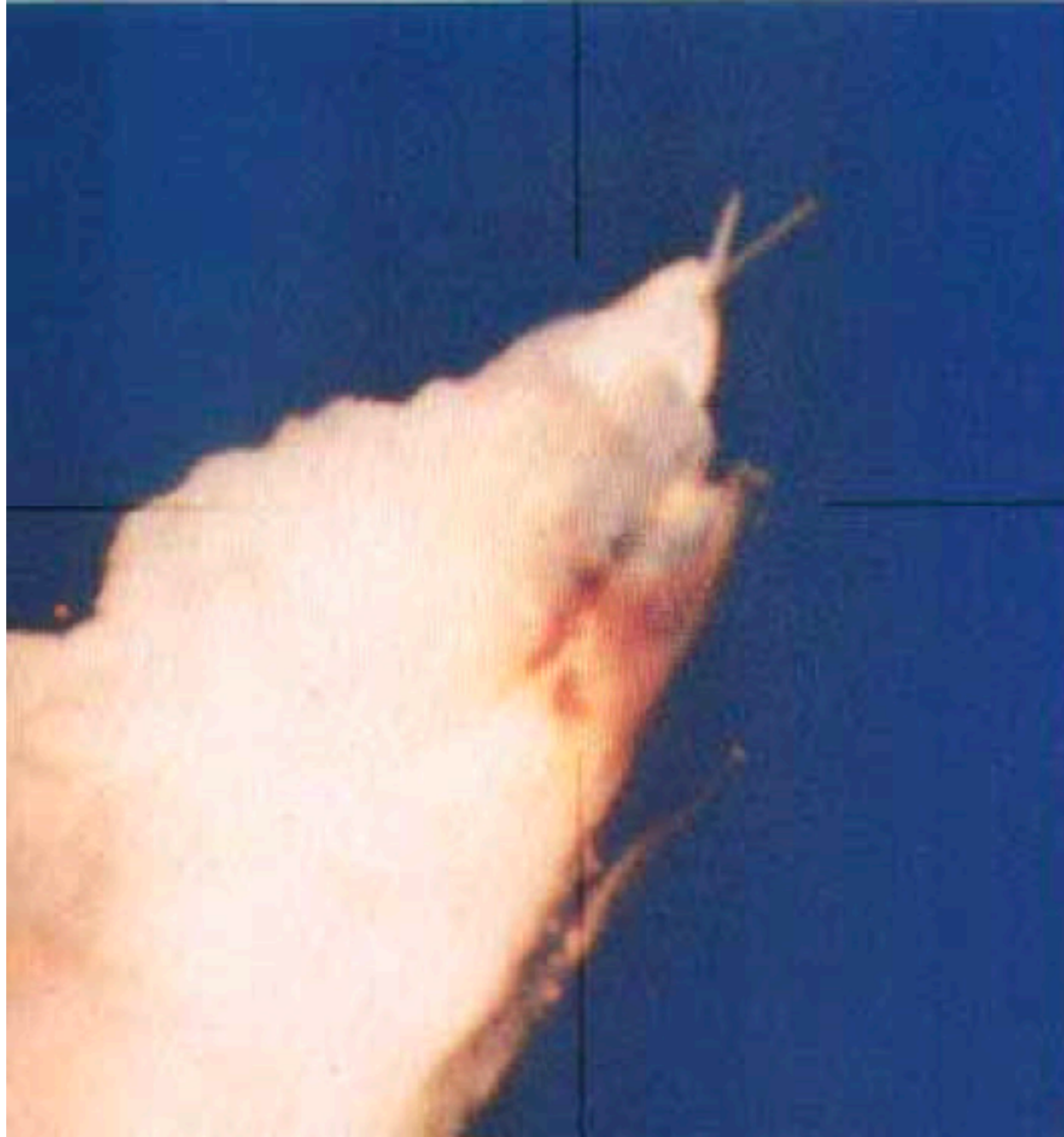


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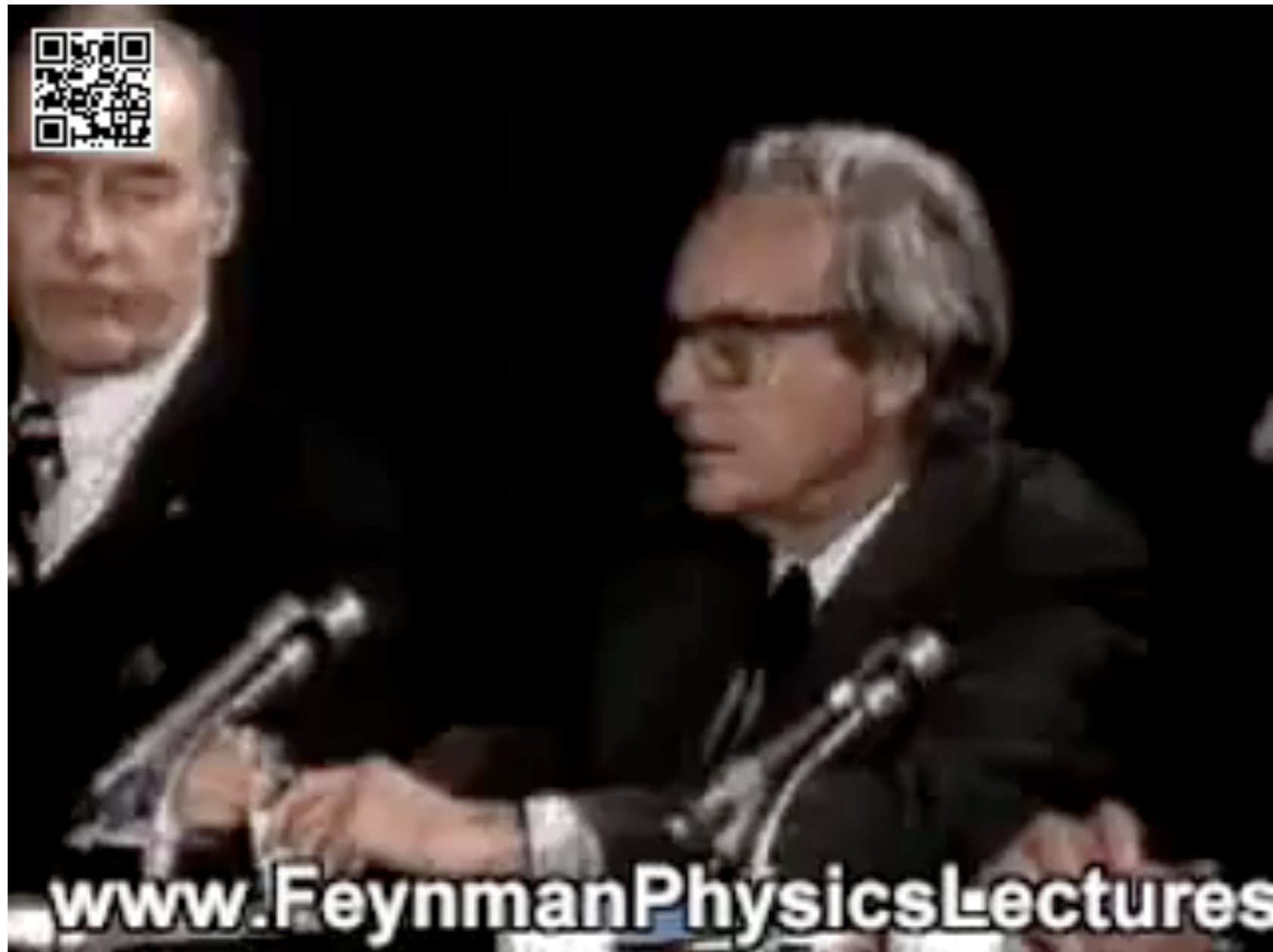
Immediately after solid rocket motor ignition, dark smoke (arrows) swirled out between the right hand booster and the External Tank. The smoke's origin, behavior and duration was approximated by visual analysis and computer enhancement of film from five camera locations. Consensus: smoke was first discernible at 678 seconds Mission Elapsed Time in the vicinity of the right booster's aft field joint.



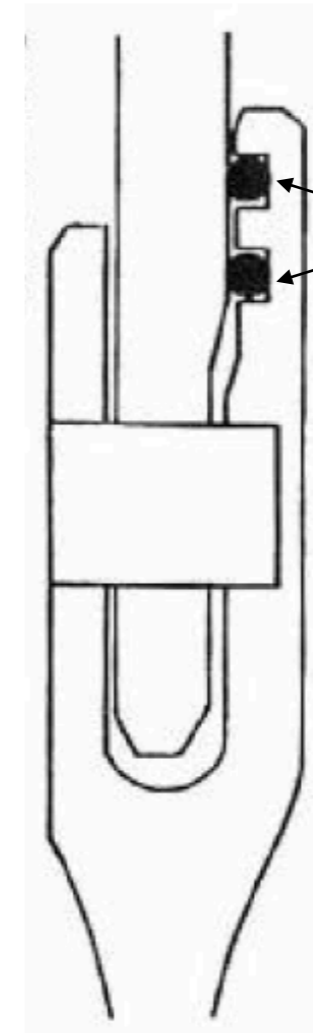
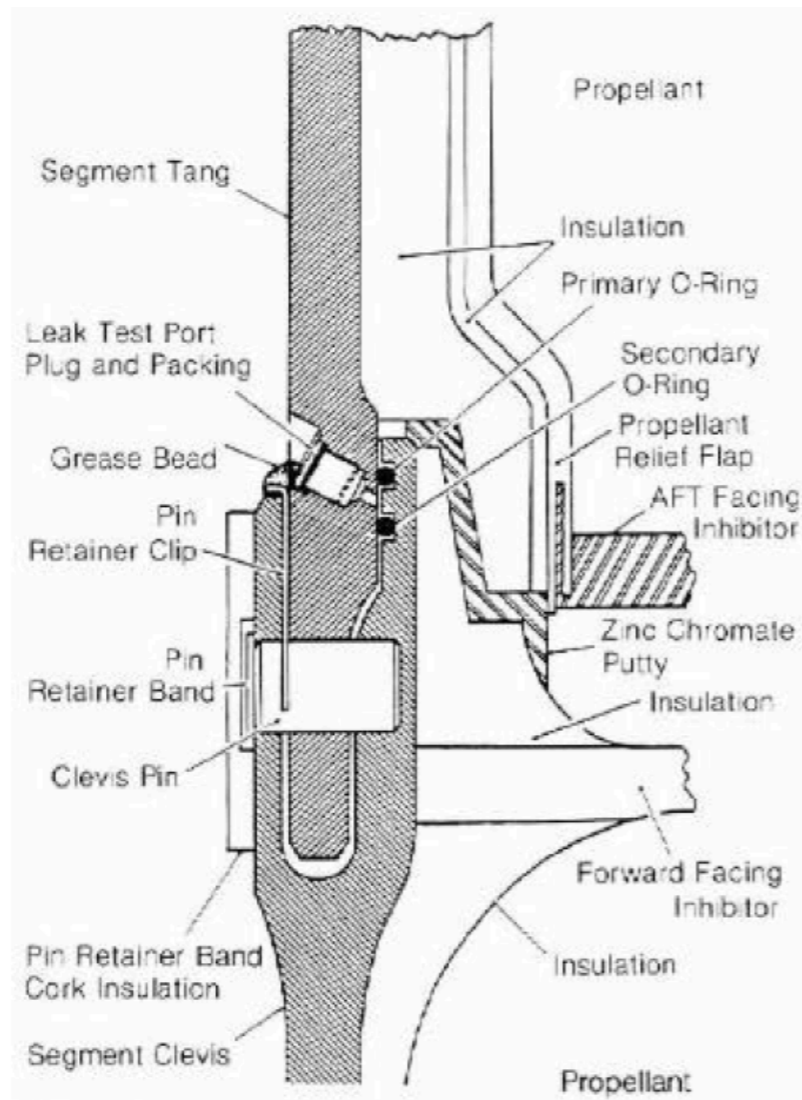
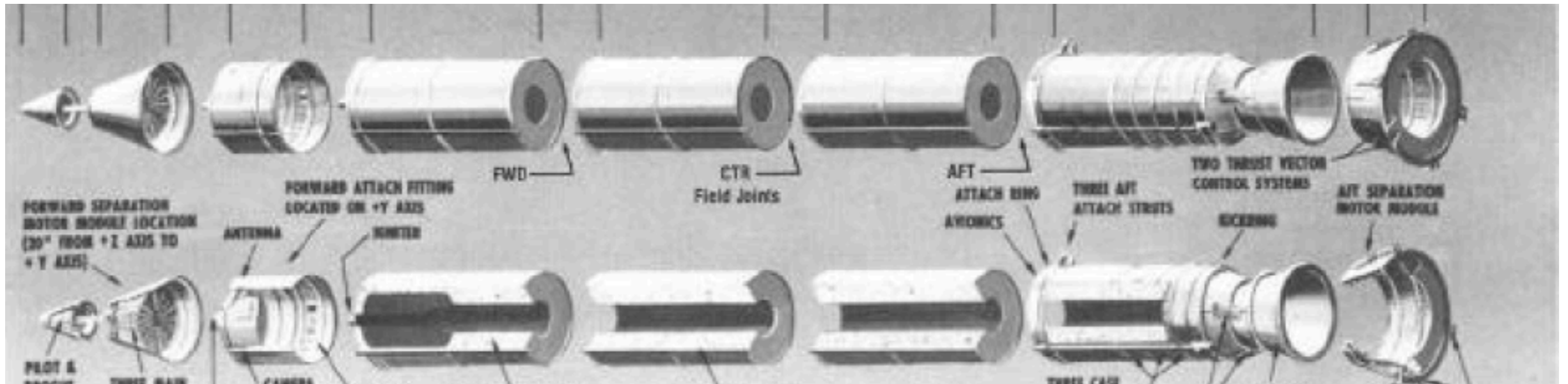
$t=58.79s$



$t=73s$




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Joints toriques

MTI ASSESSMENT OF TEMPERATURE CONCERN ON SRM-25 (51L) LAUNCH

- 0 CALCULATIONS SHOW THAT SRM-25 O-RINGS WILL BE 20° COLDER THAN SRM-15 O-RINGS
- 0 TEMPERATURE DATA NOT CONCLUSIVE ON PREDICTING PRIMARY O-RING BLOW-BY
- 0 ENGINEERING ASSESSMENT IS THAT:
 - 0 COLDER O-RINGS WILL HAVE INCREASED EFFECTIVE DUROMETER ("HARDER")
 - 0 "HARDER" O-RINGS WILL TAKE LONGER TO "SEAT"
 - 0 MORE GAS MAY PASS PRIMARY O-RING BEFORE THE PRIMARY SEAL SEATS (RELATIVE TO SRM-15)
 - 0 DEMONSTRATED SEALING THRESHOLD IS 3 TIMES GREATER THAN 0.038" EROSION EXPERIENCED ON SRM-15
 - 0 IF THE PRIMARY SEAL DOES NOT SEAT, THE SECONDARY SEAL WILL SEAT
 - 0 PRESSURE WILL GET TO SECONDARY SEAL BEFORE THE METAL PARTS ROTATE
 - 0 O-RING PRESSURE LEAK CHECK PLACES SECONDARY SEAL IN OUTBOARD POSITION WHICH MINIMIZES SEALING TIME
- 0 MTI RECOMMENDS STS-51L LAUNCH PROCEED ON 28 JANUARY 1986
 - 0 SRM-25 WILL NOT BE SIGNIFICANTLY DIFFERENT FROM SRM-15


JOE C. KILMINSTER, VICE PRESIDENT
SPACE BOOSTER PROGRAMS

MORTON THIOKOL, INC.

Wasatch Division

4. The Commission concluded that the Thiokol Management reversed its position and recommended the launch of 51-L, at the urging of Marshall and contrary to the views of its engineers in order to accommodate a major customer.

Rapport de la commission Rogers sur l'accident de la navette spatiale

(https://spaceflight.nasa.gov/outreach/SignificantIncidents/assets/rogers_commission_report.pdf)

Bullshit vs. Science

Extrait de presse 03/09/2020

Plusieurs centaines de scientifiques de la **Société de pathologie infectieuse de langue française (Spilf)** portent plainte contre le **professeur marseillais Didier Raoult**. Ces derniers l'accusent entre autres d'avoir vanté un traitement, [l'hydroxychloroquine](#), pour lutter contre l'épidémie de Covid-19 dont l'efficacité n'a pas été prouvée.

Aussi, selon une information du [Figaro](#), la Société de pathologie infectieuse estime que le chercheur marseillais a enfreint neuf articles du code de déontologie médicale : promotion d'un **traitement qui n'a pas démontré son efficacité**, diffusion de **fausses informations auprès du public**, graves **manquements au devoir de confraternité**, réalisation d'**essais cliniques dont la légalité reste à démontrer**...

Maisonnasse, P. et al. Hydroxychloroquine use against SARS-CoV-2 infection in non-human primates. [Nature](#) <https://doi.org/10.1038/s41586-020-2558-4> (2020)

Abstract

Coronavirus disease 2019 (COVID-19) has rapidly become a global pandemic and no antiviral drug or vaccine is yet available for the treatment of this disease^{1,2,3}. Several clinical studies are ongoing to evaluate the efficacy of repurposed drugs that have demonstrated antiviral efficacy in vitro. Among these candidates, hydroxychloroquine (HCQ) has been given to thousands of individuals infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)—the virus that causes COVID-19—worldwide but there is no definitive evidence that HCQ is effective for treating COVID-19^{4,5,6,7}. Here we evaluated the antiviral activity of HCQ both in vitro and in SARS-CoV-2-infected macaques. HCQ showed antiviral activity in African green monkey kidney cells (Vero E6) but not in a model of reconstituted human airway epithelium. In macaques, we tested different treatment strategies in comparison to a placebo treatment, before and after peak viral load, alone or in combination with azithromycin (AZTH). **Neither HCQ nor the combination of HCQ and AZTH showed a significant effect on viral load in any of the analysed tissues. When the drug was used as a pre-exposure prophylaxis treatment, HCQ did not confer protection against infection with SARS-CoV-2. Our findings do not support the use of HCQ, either alone or in combination with AZTH, as an antiviral drug for the treatment of COVID-19 in humans.**

L'intégrité scientifique dans notre pratique

Ne pas fabriquer de fausses données

Ne pas altérer ni embellir les données

Ne pas plagier les résultats d'autrui

Consigner et conserver scrupuleusement ses données brutes

Documenter précisément le traitement des données

Fournir libre accès aux données et à leur traitement

Citer rigoureusement le travail des autres