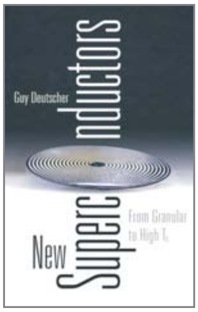

high-T_c superconductivity. In the granular variety, regions of superconductivity in a material are spatially separated from one another. Deutscher, a professor in the school of physics and astronomy at Tel Aviv University in Israel, is eminently qualified to make the connection. He has had a productive research career focused on granular superconductivity and, more recently, on the high-T_c cuprates. Deutscher's presentation of the similarities and differences implied by the subtitle is set out in the first half of the book and is persuasive for readers who carefully follow the text. For example, the separation of temperature scales describing the respective onsets of intra- and inter-grain superconductivity is argued to be analogous to the high-T_c behavior in which pairs form at a higher temperature and then condense at a lower temperature.

In another example, small coherence volumes in high-T_c superconductors are compared to small grains in low-T_c superconductors; both dramatically enhance the effects of fluctuations, which are then linked to the phase diagrams of granular and high-T_c materials. Tuning the respective control parameters—intergrain coupling and carrier doping—to drive each system from a metal toward an insulating state leads to increased T_c in both systems. A compact treatment of Coulomb screening offers possible reasons for the increase in T_c and thereby sets the stage for a later, more detailed chapter on high-T_c mechanisms that rely, paradoxically, on enhanced Coulomb interactions. The chapter's message is double-loaded, convincing, and instructional.

The second part of the book explores in more detail the unique properties of the cuprates, such as structure, doping, transport, enhanced density of states, pseudogaps, and gap symmetry. Stand-alone chapters on the basics of vortices and vortex-lattice melting facilitate a smooth transition to the final two chapters. Those two chapters address the connection between fundamentals and applications and conclude with a rather detailed discussion of the relative advantages of magnet wires and tapes made of yttrium-barium-copper-oxide (YBCO) and the more two-dimensional bismuthates. The discussion on applications provides an opportunity for the author to speculate on how further fundamental understanding might increase the scope and impact of future applications. Graduate students and experts alike will benefit from the author's insights into fundamental questions addressing the limits of high T_c, the nature of unconventional pairing, the limits to critical currents, the relevance of a BCS to BE crossover, and the problems and opportunities associated with short coherence lengths. A particularly interesting conjecture on the relationship of inhomogeneous clusters of hole-rich regions to a high-T_c mechanism returns appropriately to the recurrent theme of connecting granular and high-T_c behavior.

Unfortunately, poor editing is a major blemish on Deutscher's book. Critical figures—for example, figure 1.2—are mislabeled, figure captions are sometimes irrelevant and misleading, equations are mistyped and incorrectly referenced in the text, and grammar errors give the impression that copyediting was bypassed. Nevertheless, readers of *New Superconductors* will benefit from the unusual and compelling insights of a researcher who has thought deeply about both granular and high-T_c superconductors. I recommend it as a self-study guide for students, instructors, and researchers who are looking for understandable and crisp material on the potential and promise of high-T_c superconductors.

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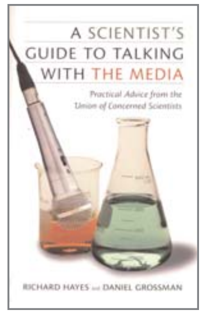
A Scientist's Guide to Talking with the Media

Practical Advice from the Union of Concerned Scientists

Richard Hayes and Daniel Grossman
Rutgers U. Press, New Brunswick, NJ, 2006. $60.00, $18.95 paper (200 pp.). ISBN 978-0-8135-3857-0, ISBN 978-0-8135-3858-7 paper

Last May NASA administrator Michael Griffin, a brilliant engineer who holds seven degrees, made the elementary mistake of replying to a radio interviewer's question by sharing thoughts that apparently just popped into his head. In short order, Griffin's comment on global warming was disavowed by the White House. Soon after, NASA issued a "clarification."

Griffin's faux pas is a classic example of what happens when an expert fails to heed the most important recommendation that authors Richard Hayes and Daniel Grossman offer in *A Scientist's Guide to Talking with the Media: Practical Advice from the Union of Concerned Scientists*: Respond live to an interviewer's questions with previously prepared answers. If you don't have a rehearsed answer for a particular question, reply with the rehearsed answer to a question that wasn't actually posed. Watch television talk shows. That practice is the modus operandi of every experienced politician and advocacy-group representative. And it will serve equally well the scientist who is briefly in the limelight.



Hayes, the deputy director of communications at the Union of Concerned Scientists in Washington, DC, and Grossman, a science journalist and educator, offer a fine introduction to the news media and give pointers on how scientists can interact effectively with them. The book is exceptional in its wide variety of comments, suggestions, and anecdotes from working scientists, not just from journalists and publicists. We scientists who have interacted with the media have our own favorite stories. Mine are from decades of media planning at NASA and at the American Astronomical Society. One involves a press conference rehearsal in Huntsville, Alabama. At the actual briefing, some reporters would be on hand while others would participate via satellite link. During rehearsal, a distinguished panelist faced the cameras when responding to questions from NASA staff impersonating reporters in the room. But he then turned and spoke over his shoulder toward a ceiling-mounted loudspeaker to respond to the simulated voice of a remotely located questioner. Further media training was in order.

On another occasion, a session chair prefaced the introduction of an invited speaker at an AAS meeting by revealing that the guest would be withdrawing his own discovery, which had just been published with great fanfare. He asked that reporters hear the expert out first before spreading the news. Almost immediately a man, crouching so as not to be too conspicuous, ran up the aisle and out of the hall. He was an ace reporter for the Associated Press, racing to the phone.

The authors have more in mind than explaining how to behave when the *Washington Post* calls. They encourage scientists to develop themselves as preferred media sources, and they give detailed instructions on how to attain that end and thereby influence public discourse on controversial topics with a science context. If you want to put in your two cents on nuclear power, stem-cell research, directed-energy weapons, or the creation of new life forms in the laboratory, and if you have the necessary expertise to do so, this book is for you.

But even if you prefer to remain safely cloistered in the peaceful halls of academia, you may nevertheless benefit from what Hayes and Grossman have to say. In my experience, much of the way the media operate is counterintuitive to physicists. When 95% of experts in a field agree on a topic, reporters will quote one or more of them, but may also include remarks by someone whose work is not taken seriously by fellow professionals but who is chosen because he or she disputes the majority position. To some journalists, that approach provides needed "balance." Usually when a reporter calls a scientist to ask a question, the journalist actually wants to know the answer. Yet it's also common for a reporter to know what answer he or she wishes to quote and call a scientist who is likely to take that position.

The book also discusses the art of writing good press releases. A scientist who writes an article begins by introducing the subject of the research and may make the error of following that practice in drafting a press release about the results. A communications professional knows that a press release must begin with the bottom line: What was discovered? The context then follows. Hayes and Grossman even advise scientists to speak in clichés during certain media interactions. It's contrary to what we were taught in school, but the approach is sometimes appropriate, as the authors cogently explain. All of these "crazy" practices, as physicists might say, are in accord with the rules of journalism.

All kinds of journalists work in different ways, and it helps to know the differences, too. Talking "on background" implies various rules on how reporters use the information, depending on their affiliations. A local television news correspondent arrives at your office, records a quick stand-up interview, and is gone in 15 minutes. The resulting sound bite of your comments will last about 20 seconds on the nightly news. Another reporter may spend a day with you and write a feature article.

Hayes and Grossman note that many researchers are critical of the daily press: Scientists don't like the selection of science topics, the singling out of a few scientists for comment, the omission of prior research, and the loose way in which the carefully nuanced conclusions of a research paper are expanded to broad, new contexts. Many researchers think that scientific significance should be the prime criterion for featuring a research result in the mass media, and they don't understand why it emphatically is not. But such critics should realize that when it comes to newspapers, "if there were a paper written the way they would like it, nobody would read it," according to a British scientist quoted in Hayes and Grossman's book. If researchers read *A Scientist's Guide to Talking with the Media*, it will help them to understand.

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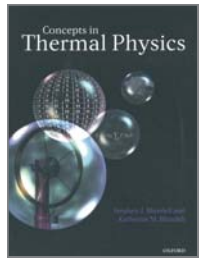
Concepts in Thermal Physics

Stephen J. Blundell and Katherine M. Blundell
Oxford U. Press, New York, 2006. $85.00, $45.00 paper (464 pp.). ISBN 978-0-19-856769-1, ISBN 978-0-19-856770-7 paper



Students' first exposure to statistical mechanics and thermodynamics is always tricky. The mathematical machinery is quite simple, but the concepts are somewhat outside the framework set up in other physics courses. Moreover, with so many results derived from so few assumptions, it is important that the presentation be clear and logical. *Concepts in Thermal Physics* by Stephen J. Blundell and Katherine M. Blundell fulfills that need admirably, and their textbook will be very useful for an undergraduate course in thermodynamics and statistical mechanics.

The authors, who teach in the physics department at Oxford University, first cover basic statistical ideas, then discuss thermodynamics before returning to statistical mechanics. The approach is a good choice: Thermodynamics can—with a few experimental inputs—be applied in a broad range of disciplines to complex systems for which statistical analyses would be impractical. It is important for physics instructors to not lose sight of that generality. To treat thermodynamics as merely an application of statistical mechanics is analogous to treating elasticity theory as just an application of atomic interactions. However, those who favor beginning with statistical mechanics first, as it is more fundamental and therefore easier to understand, may prefer the second edition of *Thermal Physics* by Charles Kittel and Herbert Kroemer (W. H. Freeman, 1980).

I also like the fact that the first physical system discussed in the text is a gas rather than a spin chain—the former is associated more with everyday experience. Although the calculations for a spin system are simpler, the treatment of gases is also easy to understand. On a related note, several figures in the