

Superconductors. A. V. Narlikar. Oxford University Press, Great Clarendon Street, Oxford, OX2 6DP, United Kingdom. 2014. xii + 477 pp. Price: Rs 3355 (Hardcover); Rs 1425 (Kindle edition).

From large hadron collider to magnetically levitated trains, the phenomenon of superconductivity has caught the fancy of the common man and researchers alike, ever since it was discovered by Kamerlingh Onnes in 1911. So far, numerous books have been written covering basic and applied aspects of superconductivity. They include classics such as *Introduction to Superconductivity* by Michael Tinkham, excellent books written from applied perspectives such as *Foundations of Applied Superconductivity* by Orlando and Delin, short introductory texts such as *Introduction to Superconductivity* by Alistair Christopher Rose-Innes and many other books covering specific classes of superconductors and applications. The question therefore is, what does a new book on this subject has to offer?

Like many other sub-fields of condensed matter, the field of superconductivity has been driven by the discovery of new materials. In the first 50 years after the discovery of superconductivity, intense efforts in materials science led to 4-fold increase in the superconducting transition temperature, from 4.2 K in mercury to 18.3 K in Nb_3Sn , even though the microscopic origin of this phenomenon remained unresolved. The celebrated theory of Bardeen Cooper and Schrieffer in 1957 provided the first rational framework to understand the origin of this phenomenon. However, this theory failed to explain superconductivity in the doped cuprates discovered in 1986, which for the first time pushed the transition temperature of a superconductor

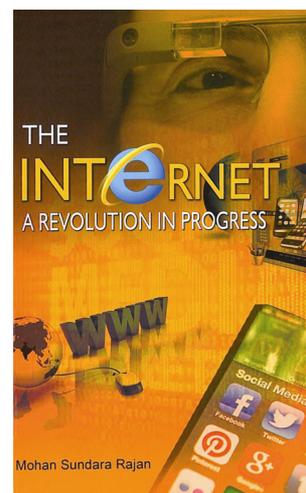
above the boiling point of liquid nitrogen. Till date the origin of superconductivity in these materials remains a mystery. Subsequently, several new classes of superconductors have been discovered for which the microscopic origin of superconductivity remains partly or fully elusive.

The book under review on this subject written entirely from this material perspective. The first five chapters give a brief overview of the discovery and the existing theoretical framework to understand this phenomenon. Chapter 6 discusses the theory and experimental design strategies to enhance flux pinning in type II superconductors, the most important property to realize their application in high current-carrying wires and superconducting magnets. The rest of the book (chapters 7–21) is devoted to superconducting materials. It gives an accurate, an up-to-date account of various classes of superconducting materials, starting from conventional alloys widely used in applications (e.g. Nb-Ti , Nb_3Sn) to newer superconductors such as magnesium diboride, iron-based superconductors, the quaternary borocarbides and doped high temperature cuprates. The book does a commendable job of covering this extremely vast and diverse landscape, covering latest developments in each class of materials. Some very new classes of superconductors, such interfacial superconductors like $\text{LaAlO}_3/\text{SrTiO}_3$ and non-centrosymmetric superconductors are missing from this list, but that is possibly inevitable in a continuously evolving subject like superconductivity.

This book fills an important void in the pedagogical superconductivity literature, where materials are often described only in the passing, only to substantiate theoretical concepts. This book is an invaluable resource as a reference book for researchers. But it will be of equal help as a supplementary text for students taking an advanced superconductivity course, who need to appreciate the material diversity associated with this phenomenon. My only complaint is that the book does not have a material index, from which, the reader can quickly find the relevant text associated with a particular superconductor. I hope that this defect will be rectified in the next edition. The price of the hardcover book is somewhat steep, but a cheaper Kindle edition is also available on Amazon.

PRATAP RAYCHAUDHURI

*Department of Condensed Matter
Physics and Materials Science,
Tata Institute of Fundamental Research,
Homi Bhabha Road, Colaba,
Mumbai 400 005, India
e-mail: pratap@tifr.res.in*



The Internet: A Revolution in Progress. Mohan Sundara Rajan. National Book Trust, India, Nehru Bhawan, 5 Institutional Area, Phase-II, Vasant Kunj, New Delhi 110 070. 2014. 1st edn, xvi + 405 pp. Price: Rs 380. ISBN 978-81-237-7323-0.

The Internet has become the byword acquiring the status of verb and noun in the English lexicon. There are several books about the Internet. Each one of them focuses on a specific aspect of the field or the innovations which have made the Internet possible (for example, Walter Isaacson's book *The Innovators*). This book is different, and in a sense unique as it fulfils a felt need for a book which presents the complex technology that drives the Internet in simple language.

The book deserves credit for its completeness based on the author's own research into available materials across the globe. It has come out at the right time when the World Wide Web has completed 25 years and the Internet is poised for a big leap forward. Also, the first Web Observatory in Asia has just been set up in Bengaluru to observe the web universe and make sense of the emerging Age of Big Data.

For the first time in history, an electronic net of connectivity unites the

world with instant access and communication and exchange of text, voice, images, and sound and music. The search engines and social media have become integrated with the daily lives of millions: *Google* with two million search requests every minute; YouTube with 4 billion clips a day uploaded; Facebook with more than a billion users worldwide and Twitter with 230 million worldwide sending out over one lakh tweets a minute globally. The Internet of things, where virtually every object can be a computer, is set to drive global connectivity in the near future and that would add enormously to the data stored, posing new challenges in analysing the information.

India has the second largest user base for the Internet after China, with more than 270 million and counting by the hour. What is remarkable is the fast growth from only 20 million in 2005. A growing young generation of Internet users needs an easily accessible and balanced introduction to it, as well as its benefits and pitfalls. The book under review is designed to be of use not only to general readers but to professionals as well, with reviews of the latest trends in technology in this field.

The author, with his four decades of experience in popular science writing, is eminently qualified to undertake the challenging task. The title of the book aptly describes the current status of the Internet. The Internet Revolution is far from over; in fact, it is evolving. The book traces the origin of the Internet and points out how innovations in integrated circuits, computing, software and networking, resulted in the emergence of the free and open Web, led by its founder Tim-Berners Lee. Citing the contributions of engineers and scientists of many nations, the book points out that no single country can claim monopoly in its regulation.

One of the most interesting aspects of the book is its portraits of the pioneers of the Internet, including several Indians – Ayyadurai (e-mail), Sabeer Bhatia (Hotmail), Vinod Dham (Pentium III), Amit Singhal (*Google's* Page Ranking) and Sundar Pichai (Chrome). The changing ecosystem of the Internet is brought out in the light of the emerging cloud computing, smartphones and open software. The book outlines the growth of India's IT industry, and the challenges faced by its pioneers in computing and IT ven-

tures. The author highlights the key role of software, where India, with its young and intelligent human resources, is a leading player in the world. A separate section (Part IV, Trends in India) with quotes from A. P. J. Abdul Kalam and the *Google's* Eric Schmidt should enthuse the Indian youth to take up challenges to make the Internet beneficial to the large underserved Indian population.

Though it is a matter of satisfaction that India has the second largest number of Internet users in the world, next only to China, it would be a great challenge to take the Internet to nearly a billion people in India, currently not within its reach. It would be an equally big challenge to promote the use of the Internet not only for sports and entertainment, but for broadening the knowledge base of our students as well as for good governance. The author proudly recalls how Indian computer engineers and scientists successfully faced the international climate of denial of advanced super computer technology and turned a deficit into an asset for the nation.

The book demystifies the basic technologies that drive the Internet in non-technical terms and points out how several key innovations morphed in a short time from being stray curiosities to game changers that connected the world and impacted on nearly all sections of society.

The book is dedicated to 'all those who love freedom on the Internet'. It is timely as we are in an age of mass surveillance by the state in many countries. The author rightly points out that the term 'Internets' in plural is an oxymoron, as there can only be one Internet universally accepted as a free platform for exchange of views, news, entertainment and business, as the pioneers intended it to be. Accordingly, the book points out the danger to an open and free Internet posed by several countries. In India too it makes out a case for the removal of outmoded legal provisions in the Information Act. The author can derive satisfaction for taking up causes, not so popular when it comes to freedom on the Internet, as his frank plea to review the IT Act (pp. 243–244) has been vindicated by the Supreme Court's landmark judgement striking down Section 66A.

Megacorporate control of the Internet is analysed in the context of the proliferation of proprietary apps (applications) that have grown from 500 in the early version of the Apple phone to over

1.5 million in today's smartphones and its impact on the relevance of the open and free Web, advocated by the founders. The technological foundations of the Web are examined in terms of the Hypertext Markup Language-5 (HTML-5), which is now formally notified as the language of the Web. The book makes an extensive description of the social media such as Facebook, Twitter, Yahoo and YouTube and the search engine, *Google*, tracing their impressive growth and impact on human intercommunication, while pointing out the potential for their intrusion into the privacy of the users. The author has brought out the implications of the interplay between technology and social forces covering the issues of privacy, the Internet addictive syndrome, as well as the impact on commerce, printed word and the mass media.

The author has also turned the spotlight on the emerging Internet in terms of the Age of Big Data. He has indicated the fascinating advances being made in storing data on an unprecedented scale and the vast potential of new knowledge that can flow from using mega data.

The book is lucid, comprehensive and interestingly written, and structured in a reader-friendly way with a rich Glossary, Index and pleasing colour images of the pioneers. And the style is lively without any unexplained technical terms. What I like most are the Box Items, 53 in all, each one of them giving in-depth information in a succinct manner.

It is hoped that the author would give a more detailed account of the progress made by Indian IT industry in the later editions of the book. One wishes the publisher had used better quality paper for a book of this nature. It is also hoped that the National Book Trust (NBT) will bring an e-Book version of this important work and publish it in Hindi and other languages.

The author and NBT have done a commendable service to the younger generation. I would urge educational authorities to make the book accessible to a wide section of the student community, so that our younger generation is better informed and inspired by the pioneers of the Internet and utilize it constructively.

S. SAMPATHKUMAR

*Tata Consultancy Services Ltd,
Bengaluru 560 066, India
e-mail: sasimpath@gmail.com*