国家高技术计划
信息技术领域

DIGEST ON
OPTOELECTRONIC DEVICES
AND
SYSTEM INTEGRATION
TECHNOLOGY

# 光电子器件与微电子
# 光电子系统集成技术
# 论文摘要集
# 1986 - 1990

国防工业出版社

# Digest on Optoelectronic Devices and System Integration Technology

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1986–1990

国家科委高技术计划信息领域办公室　编

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## 内容简介

本论文摘要集主要包括以下内容：光电子器件与微电子·光电子系统集成技术综述；光通信系统技术；光通信器件；光电子集成器件；光纤导波光学器件；光计算算法及器件；新型材料、器件和工艺技术。

读者对象：从事光通信、光计算、光传感、光互连专业的科技人员，大专院校师生。

**光电子器件与微电子·光电子系统集成技术论文摘要集**

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# 前　言

在本世纪大量杰出的科学技术成就中，最引人注目的是50年代高技术兴起。其中，信息技术方面取得的重大突破起了关键作用。1946年电子计算机的发明，使人类的部分脑力劳动可以借助于工具来完成。1948年半导体晶体管的发明，以及接着1959年以晶体管为核心的微电子芯片的诞生，使很多先进的电子系统的设计构思，可以在神奇的小硅片上实现。早在50年代就已迅速形成了很有特色、非常活跃、技术密集的新型半导体、计算机和通信等产业，即高技术产业。信息技术的每一步提高，都会产生超过它自身价值几倍至数十倍的效益。信息技术的研究开发和应用水准已经成为衡量一个国家发达程度的主要标志。也正因为这样，在当代高技术发展中，信息技术是领头率先的技术。

我国早在1956年就认识到信息技术发展的重大战略意义，做出了英明的决策，即在《一九五六年——一九六七年全国科学技术发展远景规划》中把发展半导体、计算机、自动化、电子学作为振兴科技的紧急措施来抓。由北京大学、复旦大学、南京大学、吉林大学和厦门大学等五所高校联合起来集中培养高水平创业人才，在中国科学院组建四个研究所，紧接着在工业部门设厂和建产业研究所，为我国信息技术的创业和推动国家高技术的发展奠定了良好的基础。30多年来，在推动我国信息技术进步中，各部门领导和专家们付出了艰辛的劳动和智慧，为发展国民经济、增强国防实力和重大科技工程的完成作出了重要贡献。

1986年3月中央批准了我国四位科学家提出的在高技术方面跟踪世界科技发展的重要建议，组织力量制定了针对本世纪末、下世纪初我国经济和科学技术持续发展有重要意义的中、长期高技术发展计划，即"八六三"计划。在对这项计划的研究战略目标征求意见和酝酿时，信息技术的跟踪又被科学家优先提名列出。考虑到它在高技术发展中的突出位置，所以信息技术与生物技术、航天技术共同列为重中之重。八六三计划中信息技术领域包含三个主题，即智能计算机系统、光电子器件与微电子·光电子系统集成技术、信息获取与处理技术。这样选取主题是立足于20世纪末和下世纪初的发展，预测在那个时候对科技发展和新兴产业的形成起关键作用的技术，它们也是世界各国在90年代实施的大型科技发展计划中重要的内容。

自八六三计划实施以来，在信息领域全体专家的共同努力下，三个主题的研究都取得了显著进展。这套（共三册）文摘集反映了部分有代表性的研究成果，大家共同的心愿是把它作为一份礼物献给八六三计划诞生五周年。这些成果表明，在中华大地上我国科学家们是能够大有作为的，只要我们勇于拼搏、积极进取，就一定能实现在未来的国际高科技发展中占有一席之地。

1991年1月

# Forward

In the present century numerous outstanding accomplishments in science and technology have been made, but the rise of high technology emerged in the 50's is most spectacular. The success of high technology to a great extend attributed to the major break-throughs in information technology. The invention of computer in 1946 enabled the mankind to replace a part of brain work with tool for the first time ever in the history. Later on the semi-conductor transistor created in 1948 and the success in 1959 of building micro electronic chips with transistors as main components made it possible to have many advanced design ideas of building electronic system realized on a magic small piece of silicon chip. High technology industry was formed as early as in the 50's. It rapidly developed into very unique, active and technology intensive new industries in the field of semi-conductor, computer and communications. Since then every step forward of information technology development would generate a benefit several to dozen times higher than its own value. The level of R&D and application of information technology has therefore become a key indicator in measuring a nation of its level of development. This is why information technology plays the leading role in high technology development today.

The strategic importance of information technology was first recognized in China as early as 1956, thus a wise decision was made to include the development of semi-conductor, computer, automation, and electronics in the **1956-67 NATIONAL OUTLINE FOR DEVELOPMENT OF SCIENCE AND TECHNOLOGY** as an emergency measure aimed at revitalizing science and technology in China. Five universities including Beijing, Fudan, Nanjing, Jilin and Xiamen were then designated to coordinately train high standard personnel and four research institutes were established under the Chinese Academy of Sciences together with other new set-ups of industrial research institutes and factories under different industry sectors, which as a whole laid a good foundation for the initial development of information technology as well as development of our national high technology. Over 30 years in the past, leaders at various levels and experts have put in a lot of hard work and wisdom in the effort of developing our information technology, the result of which have made major contributions to the development of our national economy, reinforcement of our defense capability and accomplishments of key scientific and technical projects.

In March 1986 the Central Committee of the CPC adopted the important advise, which had been put forward by four scientists, aimed at keeping up with high technology development of the world. As a result, a high technology research and development program (HTRDP) was formally established in order to address the important significance of high technology for the further development of our national economy, science and tech-

nology by the end of this century and the beginning of the next. During the formulation process of the program, when comments and views were sought, scientists suggested to list information technology as a priority in the program. In consideration of the outstanding position in high technology development, it has been listed together with biotechnology and space technology as super priorities of the program. In the area of information technology of the HTRDP Program, three main topics have been identified as follows: Intelligent computer system; Optoelectric components and technology of its integration with micro electronic and optoelectronic system; and Information acquisition and processing technology. These topics were purposely selected for building reserves for our development in the end of this century and the beginning of the next based on the estimation that the technologies to be resulted from the three topics would play key roles in development of science, technology and so in newly emerging industries by then. Meanwhile, the same topics are also included in major S&T development programs as important subjects for the 90's by other countries in the world.

With joint efforts devoted by all experts working in information field, remarkable progress has been made on all three topics since implementation of the HTRDP. The papers of this proceedings (in three volumes) reflect a part of representative research accomplishments. It is our common wish to dedicate this publication to the fifth anniversary of the founding of the HTRDP . These achievements approve that our scientists do have bright prospects on the vast land of China, and we firmly believe that certainly we will be able to obtain a seat in the future competition in international development of high science and technology if we vigorously make our endeavors and keep marching forward.

Director General
Department of Basic Science and High Technology
State Science and Technology Commission
January, 1991

# 编 写 说 明

一、本书是由国家科委高技术计划信息领域办公室为纪念"八六三"计划实施五周年而组织编写的。由信息领域各主题办公室汇集了有关专家在1986～1990年发表的重要论文摘要及其译文，供国内外有关读者参考。

二、书中7个部分的分类是按光电子器件与微电子·光电子系统集成技术主题项目的7个专题划分的，每篇文摘按其对应的课题所属的专题归类。有些文摘的归类可能不够合适，请谅解。

三、同一分类中文摘的刊登顺序按收稿时间的先后排列。

四、每篇文摘的最后一行说明该论文的首发处。

五、所有论文摘要及其译文均由作者提供，文责自负。

六、由于收取了最新发表的论文摘要，所以本书编印时间比较仓促，不足之处在所难免，敬请读者批评指正。

# Words from Editor

Ⅰ. For the Fifth aniversary of implementation of 863 program, the Office of Information area of High-tech Program edited this book, consisting of abstracts of representative papers and their English versions published in 1986–90. They are compiled by each major Subject Office in the information area for the benefit of interest readers.

Ⅱ. The Classification of the abstracts is based on the project administration system so it might be unperfect in the point of view of technology.

Ⅲ. The abstracts in the same catalog are arranged in the sequence of time when they are acquired.

Ⅳ. The last line of each abstract indicates the original source of the paper.

Ⅴ. All the abstracts and their translated versions are in such unedited form as provided by authors themselves.

Ⅵ. We would like to acknowledge everybody who gave his support for our work.

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