

Present and Future Views of the Division of Solid State Physics and Applications



Hajime ASAH

Chief, Division of Solid State Physics and Applications
Japan Society of Applied Physics

In this report, we will provide an introduction to the Division of Solid State Physics and Application (SSPA) (URL: <http://annex.jsap.or.jp/support/division/ohden/>; in Japanese). The establishment of this Division can be traced back to 1942, with the initiation of the *Denshi Hosha Kenkyukai* [Electron Emission Society]. In 1962, at a time when the activities of the members were undergoing a shift from vacuum tubes to semiconductor devices, the name of the organization was changed to the broader Division of Solid State Physics and Application, as it is known today. Throughout its long history, the Division has continued to provide a venue for discussions on the most advanced electronic devices of the era, and on the fundamental physical properties of these devices. It also played an important role in the establishment of the International Conference on Solid State Devices and Materials (SSDM). The route taken by the Division's activities are directly paralleled by the history of developments in the field of semiconductor electronics.

The Division has constantly held the meetings from the early stages of every area of research and development related to semiconductor electronics; such as the increased scale of integrated circuits and band gap engineering in compound semiconductors, as well as heterostructures, quantum structures, photonic devices, and high-frequency devices. Research targeting Group III nitride semiconductors has recently gained much momentum, but the Division began to hold the meetings on this theme far before this boom began. This planning/organization was the result of the keen sense displayed by approximately 30 managing staffs of the Division, and their devotion to their own research activities. Over its long history, spanning some sixty years—including the era of the Electron Emission Society—the Division of Solid State Physics and Application has fulfilled an important role by holding the meetings on the electronics in Japan, and particularly semiconductor electronics, thanks to its broad scope of the name “solid state physics and applications”.

More recently, the Division has been holding meetings five times each year, and has published a Division Journal at the same pace, containing the proceedings of these meetings. Other main activities include hosting symposiums during the annual meetings of the Japan Society of Applied Physics (JSAP), and holding school seminars whenever the opportunity presents itself. As one tradition of the Division, six-page summaries of lectures presented at the various meetings are published in the Division's Journal, and this Journal is distributed to all members. This member service is unprecedented in any other Division's activities. In addition, recently, reports on the meetings are be-

ing published in the same Journal and have been delivered to members. There are currently more than five hundred members.

Meeting themes during 2001 were: (1) next-generation high-frequency power GaN/SiC electronic devices, (2) nanotechnologies, (3) spintronics, (4) increased efficiency and output of nitride semiconductor LEDs, and (5) carbon nanotubes. The Symposium theme that year was “Ferroelectrics vs. MRAMs.” Meeting themes in 2002 were (1) organic semiconductor electroluminescence devices, (2) photonic crystals, (3) nanoparticles, and (4) new horizons in nitride semiconductors. The theme taken up during the symposium in 2002 was solar power generation; the school offered an introduction to quantum computers with a focus on devices, and an introductory seminar provided an introduction to spin electronics designed especially for easy understanding by semiconductor researchers.

In addition to themes of interest to all members, the Division has also taken up themes that concern a small number of members, which might draw fewer participants, but which are considered to be important. Several of these themes have gained much greater significance later on; for example, the “Amorphous Semiconductor Seminar” and “Wide Bandgap Semiconductors.” In this way, the Division has also been active in areas that have brought about major breakthroughs.

The Division is currently planning a celebration to commemorate its 60th year of operations. A similar 50th Anniversary Event was held ten years ago; this year, we will look back on the past ten years, and look ahead to the coming ten years as well. Among the festive activities will be a commemorative symposium and the publication of a commemorative issue of the Division Journal. Five presentations have been scheduled for the symposium, on the themes of increasing miniaturization of Si devices, optical signal processing devices, short-wavelength light emitting devices, wide bandgap semiconductor electronic devices, and spin electronics. In each case, the lecturers will be researchers currently active on the front lines of research fields that will be of great important now and in the future. We look forward to highly informative lectures that will offer many suggestions for future activities.

In the future, the Division of Solid State Physics and Application will continue to hold meetings, symposium, schools, and seminars taking up a wide range of themes—timely themes, themes with future potential, and themes targeting uncharted frontiers—and by doing so will contribute to the advancement of research and development in the field of Applied Solid State Physics.