

Present Activities and Future View of the Division of Solid State Physics and Applications



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Our division was established in 1942. At that time, the division was called “Denshi Hosha Kenkyu-kai” (The Electron Emission Society). In 1962, the name of the organization was changed to The Division of Solid State Physics and Applications (present name of the division) because activities on electronic devices shifted from vacuum tubes to semiconductor devices. The division has continued to provide a forum for discussions on the most advanced electronic devices of the era and on the fundamentals and physical properties of such devices and materials. The division also played an important role in the establishment of the International Conference on Solid State Devices and Materials (SSDM). The history of the division’s activities directly corresponds with the history of semiconductor electronics.

The division has constantly held meetings from the early beginnings of semiconductor electronics, such as silicon electronics and integrated circuits, bandgap engineering in compound semiconductors, heterostructures, quantum structures, photonic and high-frequency devices, as well as solar cells, ferroelectric memory, and carbon nanotubes. Research on Group III nitride semiconductors has gained much attention recently, but the division began to hold meetings on this theme far before this boom began. This planning and organization are managed by approximately 30 staff members of the division — people who have their own research activities in various fields of semiconductor electronics. Throughout its 60-year history, including the era of the Electron Emission Society, the Division of Solid State Physics and Applications has played an important role by holding meetings on electronics in Japan, particularly various fields of semiconductor electronics, as is represented by the name “solid state physics and applications.”

At present, the division has more than 400 members and holds meetings five times each year, and it has published division journals containing the proceedings of these meetings at the same pace. Other main activities of the division include hosting symposiums during the annual meetings of the Japan Society of Applied Physics (JSAP) and holding school seminars whenever the opportunity presents itself. One tradition of the division is publishing six-page summaries of presentations

at various meetings in its journals and these journals are then distributed to all members by mail. This service is unprecedented among other divisions. The division journal also includes reports on past meetings.

Meeting themes during 2007 were (1) novel “nanotubes,” (2) physics and device applications of ZnO-related heterostructures, (3) semiconductor lasers, (4) fundamentals and applications of surface plasmon, and (5) GaN electron devices. In addition, a symposium on recent progress of solar cells was held during the annual fall meeting of the JSAP. In 2008, we held a meeting on (1) medical applications of nanotechnologies. Meetings on (2) novel approaches to white LEDs and (3) nanofabrication technologies will be held, and two more meetings will be planned this year. A school seminar was also held during the annual spring meeting of the JSAP on the fundamentals and applications of ZnO-related materials. The topics the division have recently covered a wider range of fields, including not only electron and optical devices and nanotechnology but also new materials, bio- and medical electronics, and other new fields. In addition to the themes that interest many members, the division has also taken up themes that concern fewer members. Though these themes might draw fewer participants, they are nonetheless considered to be important. Several have gone on to gain much greater significance, for example, the “Amorphous Semiconductor Seminar” and “Wide Bandgap Semiconductors.” The division has also played an important role in determining academic roadmaps to 2040, which were organized by JSAP, particularly in the field of nanostructures and nanotechnologies. In this way, the division has also been active in areas that have brought about major breakthroughs.

In the future, the Division of Solid State Physics and Applications will continue to provide a forum for discussions by holding meetings, symposiums, schoolings, and seminars that cover a wide range of themes — timely themes with future potential, and themes targeting uncharted frontiers — and by doing so will contribute to furthering research and development in the field of Applied Solid State Physics. Any suggestions for future activities are welcome.

JSAP