
Preface

The Harima International Forum has been held in Harima Science Garden City since 1999, sponsored by Hyogo Prefecture, Japan Synchrotron Radiation Research Institute (JASRI), Japan Atomic Energy Research Institute (JAERI), Institute of Physical and Chemical Research (RIKEN) and Himeji Institute of Technology (HIT). The previous forums have dealt with topics of the materials sciences and the life sciences in turn.

The 5th Forum was held from 12 to 14 July 2001 at SPring-8, which is a part of Harima Science Garden City. A distinguished group of invited participants from USA, Europe and Australia, as well as Japan, gave talks and presented posters.

The theme chosen was 'New Aspects of X-ray Imaging Technology with Synchrotron Radiation – Present Status and Future Possibilities'. Although the scientific applications of synchrotron radiation are generally regarded as being predominantly in the areas of diffraction (mainly structure analysis/identification) and spectroscopy, there has recently been increasing interest in imaging, which in a generalized sense we may define as obtaining information about some property of a specimen at a high spatial resolution. Depending on the particular property, there may in addition be a requirement for high temporal, spectral and/or angular resolution. Since the advent of the third-generation synchrotron facilities, of which SPring-8 is a notable example, the available resolution in space, angle, time and spectrum has been steadily advancing. It is worth noting that it is improvements not just in the synchrotron source but also in optical components and

detectors which are responsible. Many of the papers in this issue make this point very clearly.

Under the general theme, presentations, both oral and poster, were held under five categories: general imaging, microscopy, computed tomography, topography and microbeam applications. A limited selection of these presentations have been prepared as papers included in this special issue of the *Journal of Synchrotron Radiation*. From such a wide range as is implied in these headings, it might seem difficult to draw any very specific overall conclusions; nevertheless, there is one motif which appears repeatedly, and in most of the imaging categories, namely the increasing importance of phase contrast as an imaging modality for X-rays. Starting about eight years ago, several groups have been investigating various possibilities for X-ray phase contrast, and it seems fair to say that it is now an established technique, which should be considered in many, if not all, cases if one wishes to utilize the capabilities of synchrotron X-ray imaging to the full. The high spatial coherence of synchrotron sources is of particular importance in this context.

Thus the recent X-ray images provide much information that has hitherto not been available. The advances in X-ray imaging technology will be important in both the biomedical and materials sciences. In particular, the X-ray images with high spatial (two and three dimensions) and temporal resolution will greatly contribute to the progress in these areas.

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