

# Synchrotron Radiation Research: Retrospect and Prospect

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Photons are good probe for characterizing matters. Therefore, we are continuously developing brighter photon sources to enhance our characterizing power for matters and materials. Synchrotron radiation (SR) offers the best available photon sources in the higher-energy part of the spectrum where the classical lasers are difficult to achieve.

More than 70 years have passed since the first observation of SR at GE laboratory in 1947. Even the 2<sup>nd</sup> generation sources emerged more than 35 years ago. We are now in the middle (or at the end?) of the 3<sup>rd</sup> generation SR era, and seeing the sharp rises of the linac-based free-electron-lasers (FELs) and multi-bent-achromat (MBA) lattice-based high brightness machines, in which the major photon emitting devices are undulators. During these 70 years, we have seen more than  $10^{12}$  times enhancement of the photon brightness.

User community has grown dramatically for these 70 years, and will continue to grow with some phase transition. Most of the users in the early years were photon scientists in a wider sense. Many materials scientists and structural biologists entered into SR business after the 2<sup>nd</sup> generation, as well as some people from industries. We can easily foresee the further diversification of the users in the future.

Some retrospect for these 70 years would lead some prospect. The author would like to discuss what we should do and/or what we should not do in the near future.