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Scientific and Societal Impact of Synchrotron Light Sources

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Ever since the first dedicated light source facilities in the 1980's, synchrotron light sources have been developing rapidly around the world. These light sources essentially extend our human vision and allow us to see and investigate tiny things from microstructures to molecules and atoms, in many cases in-situ and under operating conditions. Such research activities have made substantial scientific and technological impacts in such critical areas as clean energy, microelectronics, quantum information, advanced manufacturing, bio-preparedness, and the environment. In addition to the direct impacts, the light sources also provide significant indirect broader impacts to our society. These impacts are reflected in business and economic impact to the local community, promoting high-quality education and workforce training and development, and encouraging people working together in a naturally diverse and inclusive light source environment. National Synchrotron Light Source II (NSLS-II) is a bright synchrotron facility at Brookhaven National Laboratory on Long Island, NY. It provides stable and intense photon beams, from infrared to hard X-rays, experimental capabilities, and data infrastructure to enable multiscale, multimodal, high-resolution studies on diverse systems of materials. In this presentation, I will go through a few research and activity examples from NSLS-II to illustrate their scientific, technological, and societal impacts. National Synchrotron Light Source II is a U.S. Department of Energy (DOE) Office of Science User Facility operated for the DOE Office of Science by Brookhaven National Laboratory under Contract No. DE-SC0012704.

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