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Inelastic X-ray Scattering at Third Generation Synchrotron Sources: Present Activities and Future Plans¹
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This talk will review present activities and future plans for utilizing inelastic x-ray scattering to study excitations in hard condensed matter systems. In particular, at current third generation sources it is now possible to observe the key elementary excitations in solids, including phonons, magnons, orbital excitations and electronic excitations such as plasmons and charge transfer excitations. The technique offers a number of advantages over existing methods for the study of these excitations, including especially, the ability to study very small sample volumes, the range of momentum and energy transfers available and the ability to work in disparate sample environments. A few recent illustrative examples are discussed. The first of these is a study of phonons in SmFeAs(O,F) which show an anomalous renormalization of certain phonons and for which momentum-dependent measurements of the electron-phonon coupling have been made. The second example will focus on work being performed at the Swiss Light Source in which spin waves in (La,Sr)CuO₄ have been observed. Finally, the current and future state of inelastic x-ray scattering instrumentation in this country is discussed, including the upgrade plans at the Advanced Photon Source, and plans for new inelastic beamlines at the NSLS-II source currently under construction at Brookhaven National Laboratory

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