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Intriguing photoconductivity in bulk oxides at room temperature POONEH SAADATKIA, PETR STEPANOV, FARIDA SELIM, Department of Physics and Astronomy, Bowling Green State University — Complex oxides with the ABO3 perovskite crystal structure reveal a range of spectacular phenomena such as superconductivity, ferroelectricity, and metal-insulator transitions. SrTiO3 (STO) has been the focus of intense research in the world of oxide materials due to its functional, dielectric and ferroelectric properties. In this work, Hall and photo-Hall measurements have been carried out on a number of as-grown STO samples provided from different suppliers to investigate the photo-response of bulk STO single crystals and its dependence on photon energy and intensity. Most of samples were photoconductive at room temperature but no persistent photoconductivity was observed. Vacancies are known to be dominant defects in perovskite oxides and significantly affect the material properties. Therefore, identifying the nature of vacancy defects is crucial to understand the origin of these novel photoconductivity phenomena in complex oxides in STO bulk single crystals. Positron annihilation lifetime spectroscopy and digital coincidence Doppler broadening spectroscopy were applied to examine the presence of defects. The measurements revealed the strong dependence of photoconductivity on defect concentration under illumination of sub band gap visible light.

Pooneh Saadatkia
Bowling Green State University

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