

Solid-State Electron Paramagnetic Resonance Spectroscopy

Alexander Shengelaya

Department of Physics, Tbilisi State University, 0179 Tbilisi, Georgia

alexander.shengelaya@tsu.ge

Since the discovery of the electron paramagnetic resonance (EPR) by E. K. Zavoisky in 1944, it has been used in a vast variety of applications and fundamental research. EPR is a powerful method which can provide in-situ and non-destructive information on electron spins, orbitals, and nuclei at the microscopic scale. In this lecture basic principles of EPR spectroscopy will be described and examples of the application of EPR in solid state physics and materials science will be presented. Different examples will be shown starting from the single paramagnetic centers in perovskite crystals to collective effects in magnetically concentrated compounds. It will be demonstrated how EPR helps to understand microscopic properties of these materials. Important recent development of EPR combined with scanning tunneling spectroscopy (STM) will be also discussed.