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Ultra high resolution spectroscopy and ultra-fast THz measurements using coherent synchrotron radiation

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Recently, an unprecedented high power source of THz radiation was made scientifically available: Coherent synchrotron radiation (CSR). This radiation produced from relativistic electron bunches of picoseconds duration opens up new territory in the THz range with intensities up to 4 orders of magnitude higher than previous sources. In this mode of operation (200 electron bunches of 100μA each), the total emitted power is 2 mW and its stability is sufficient to perform bunch per bunch spectroscopic measurements based on Electro Optics sampling technique. These promising results clearly lead to the development of new applications including terahertz spectroscopy at the nsec rate without the need for a pump probe technique, as well as ultra-high resolution spectroscopy based on heterodyne mixing technique. We will show how these new techniques have been demonstrated on the AILES beamline of synchrotron SOLEIL.

Biography

Pascale Roy performed her PhD research in LURE, Orsay France and received her PhD in Physics from Université Laval, Canada. She was a Post-doctoral fellow at Los Alamosin 1986-89 and was hired as CNRS Researcher at LURE, Orsay France in 1989. She became CNRS Senior Scientist in 1992 and moved her research activity to Synchrotron Soleil in 2004. Her research is focused on the implementation of synchrotron radiation based Infrared and THz beamline, new spectroscopic methods and the development of associated spectroscopic studies. She is currently in charge of the AILES (Advanced Infrared Line Exploited for Spectroscopy) at SOLEIL. She is responsible for the Condensed Matter Physical Chemistry group at Synchrotron SOLEIL.

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