



ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

# *PHYSICS COLLOQUIUM*

Thursday, 17 December 2009  
17:00-18:00

3<sup>rd</sup> Floor Seminar Room

***"Synchrotron Radiation: a novel research tool in materials science"***

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## Abstract

Synchrotron Radiation is emitted by charged particles which move with relativistic velocities in closed orbits. The unique properties of Synchrotron Radiation (high brightness, wide energy range, polarization, strong collimation) render it suitable for numerous novel applications in several scientific fields including materials science. The production of synchrotron radiation in dedicated 3<sup>rd</sup> generation storage rings as well as its unique properties and applications will be introduced. The basic principles of X-ray absorption and fluorescence spectroscopies will be described. The former is used for the study of the bonding environment (symmetry, ligation, coordination number and geometry, nearest neighbour distances) of various elements in a composite sample while the latter is used for the determination of the sample's composition. The recent development of focusing elements, which reduce the beam size to 1  $\mu\text{m}$ , permits the study of spatially resolved bonding configurations of various elements in inhomogeneous samples. Representative results from the study of semiconductors, solidified wastes and solid biological materials, using synchrotron radiation, will be discussed.