

X-ray Spectrometry at INPP

Andreas Karydas

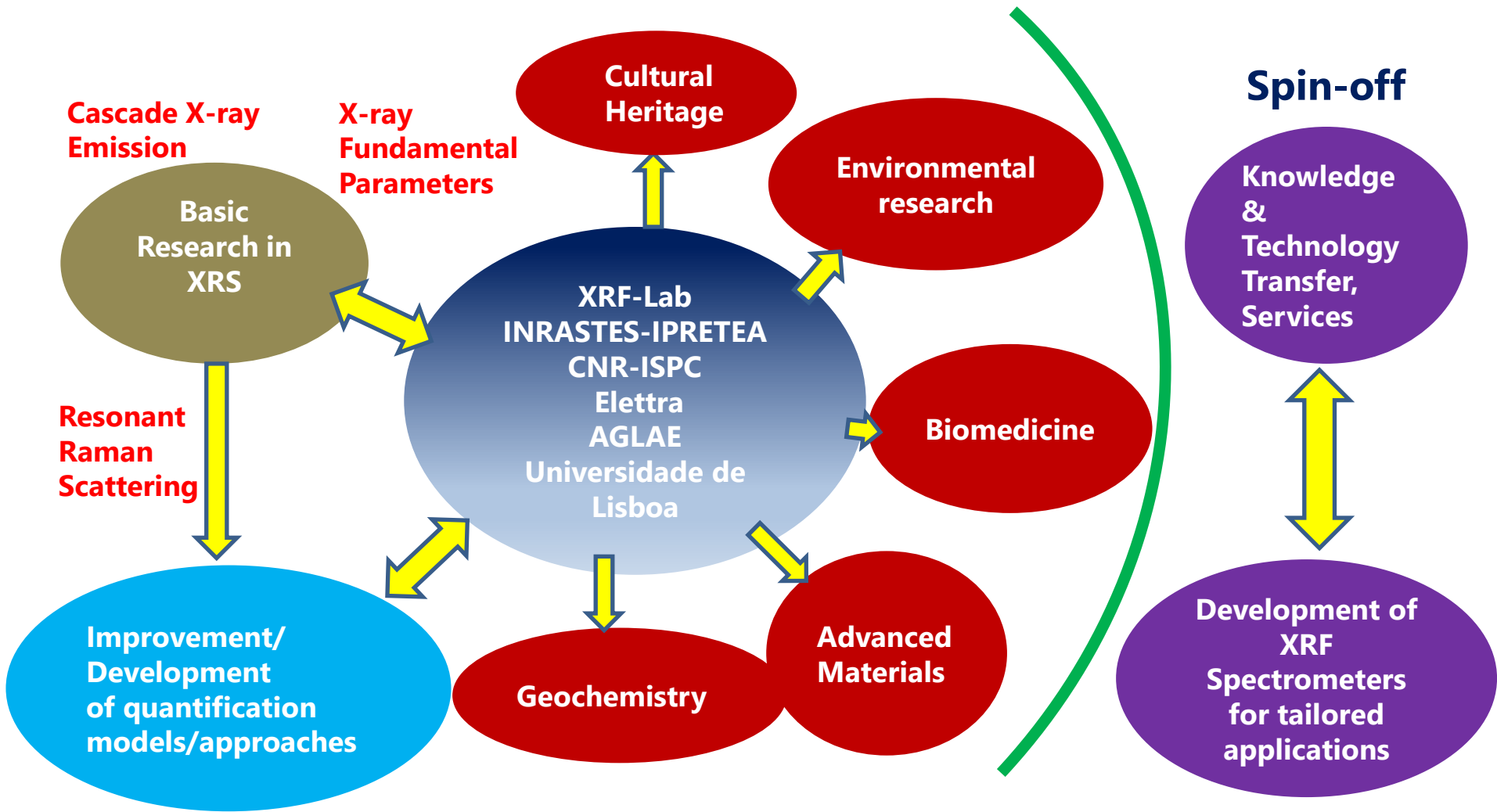
Director of Research

Head of the XRF laboratory

<http://www.inp.demokritos.gr/xrf/>

INPP, NCSR “Demokritos”

karydas@inp.demokritos.gr





LOW



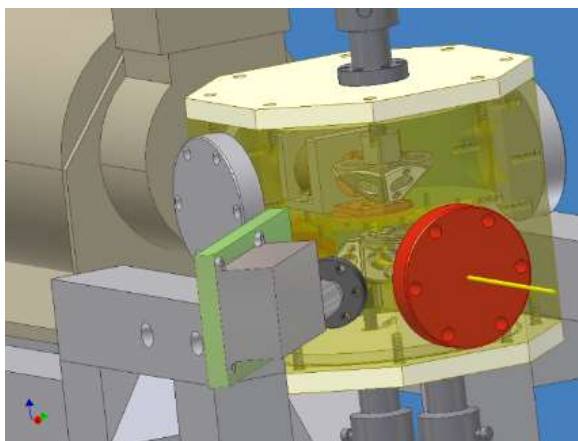
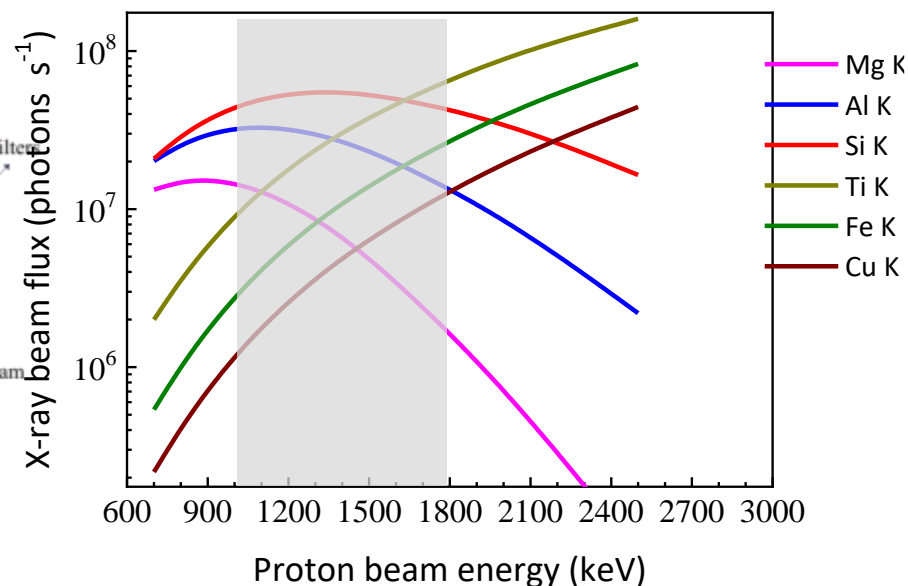
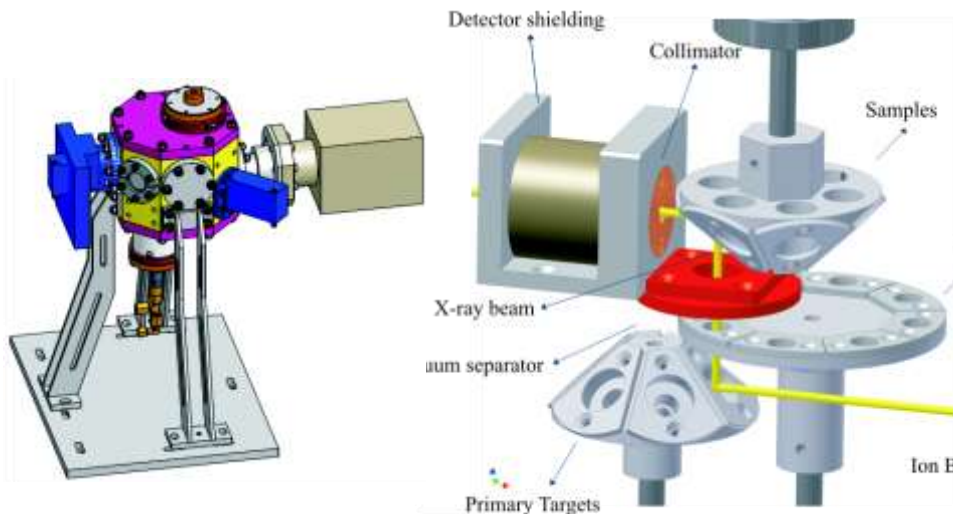
DOSE SDD



 Cluster of Accelerator Laboratories for Ion-Beam Research and Applications
  
 ΕΠΑνεΚ 2014-2020
 ΕΠΙΧΕΙΡΗΣΙΑΚΟ ΠΡΟΓΡΑΜΜΑ
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MSc

- Applications to Cultural Heritage



X-ray intensities **1.2 keV - 8.04 keV**
 @ sample position
 ~ **10⁷-10⁸ ph/s, 1 μA beam current**

D. Sokaras, et al.

Review of Scientific Instruments 83, 123102 (2012);

Physical Review A 83 (2011) 052511

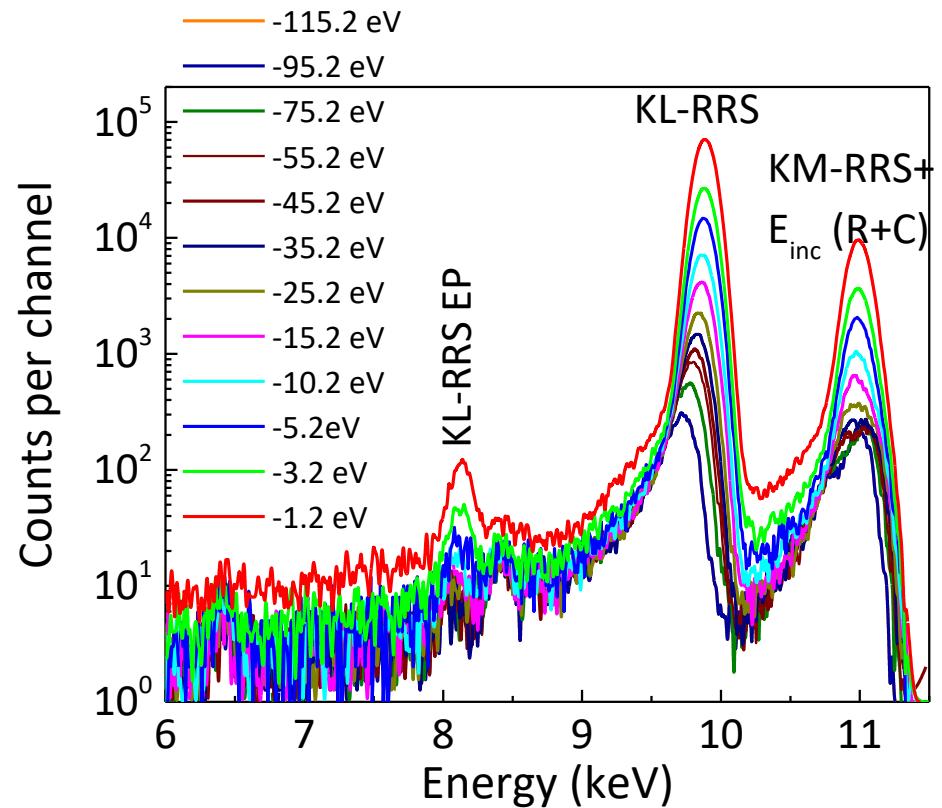
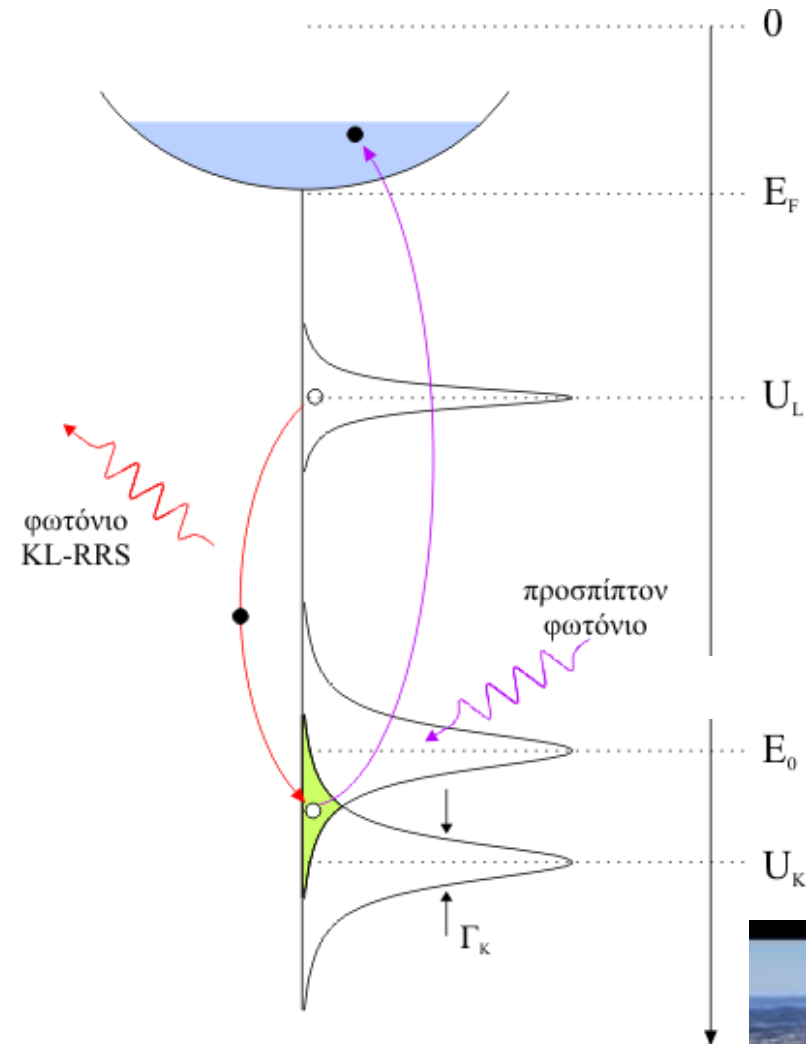
Physical Review A 81 (2010) 012703

PhD thesis (2010)

MSc thesis

- Different applied directions are open

$$H_{int} = -\frac{e}{mc} \mathbf{p} \cdot \mathbf{A} + \frac{e^2}{2mc^2} \mathbf{A} \cdot \mathbf{A}$$

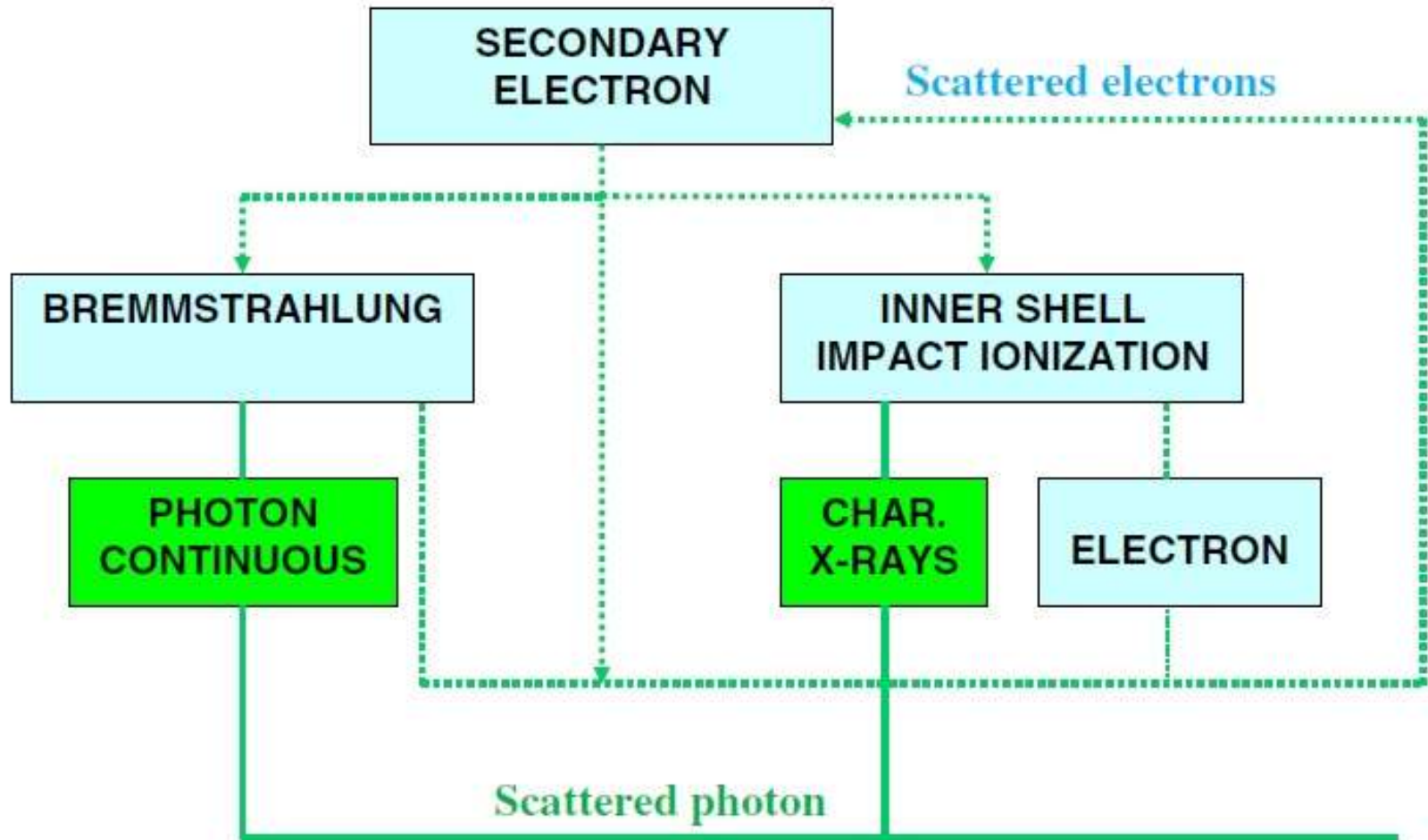


MSc/PhD Thesis

- Analysis of synchrotron data
- Development of spectrum analysis code



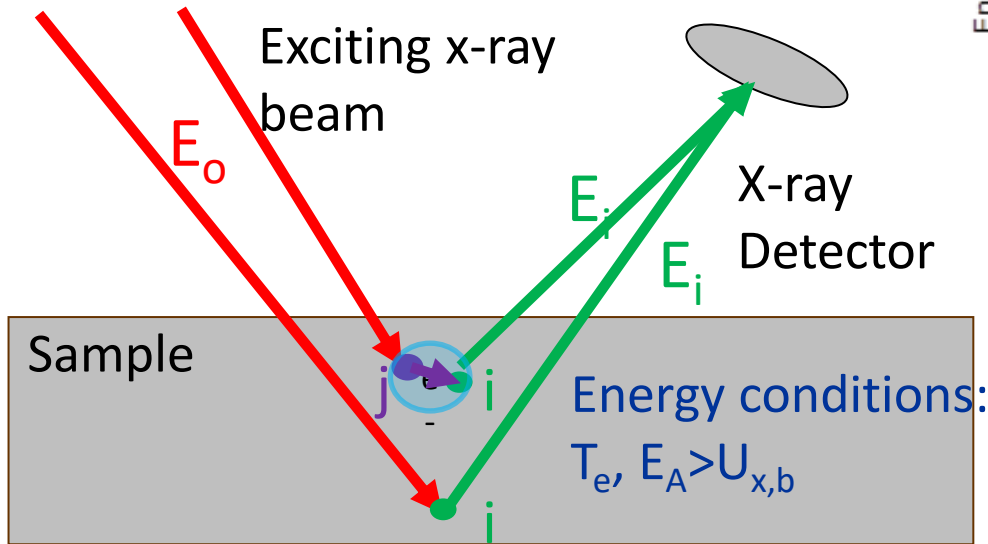
XRF Beamline
end-station at
Elettra
Sincrotrone
Trieste,
Trieste, Italy



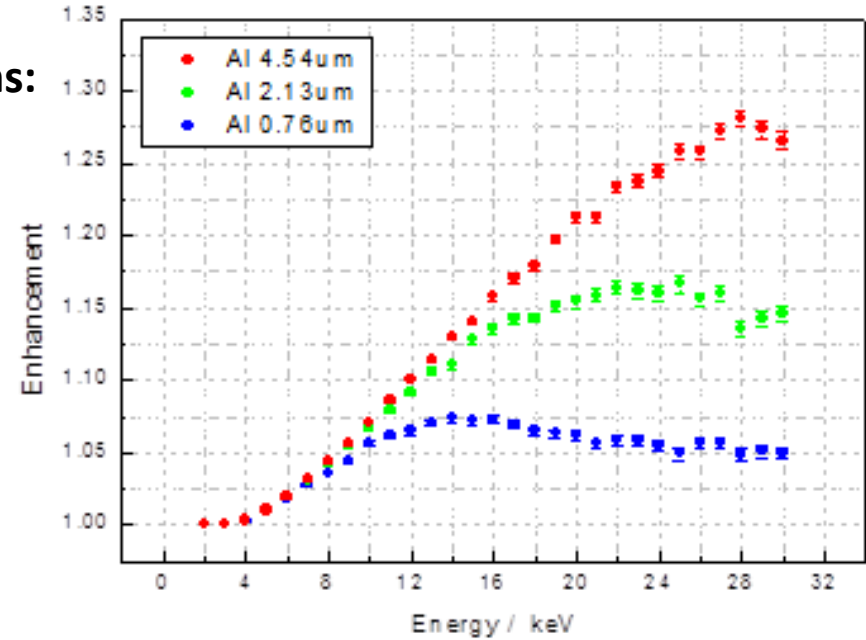
Secondary electron induced inner-shell ionizations:

Discrete energy electrons: Photo-e, Auger

Continuous energy electrons: Compton



Ejected electrons from the atoms of element j can ionize an inner shell of element i

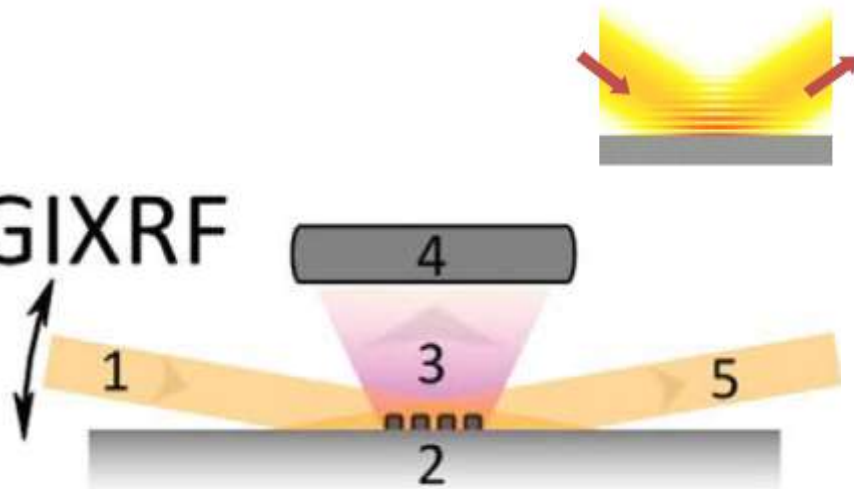


New measurements available for silicon nitride (Si_3N_4) membranes 100 - 2000 nm 4-14 keV range

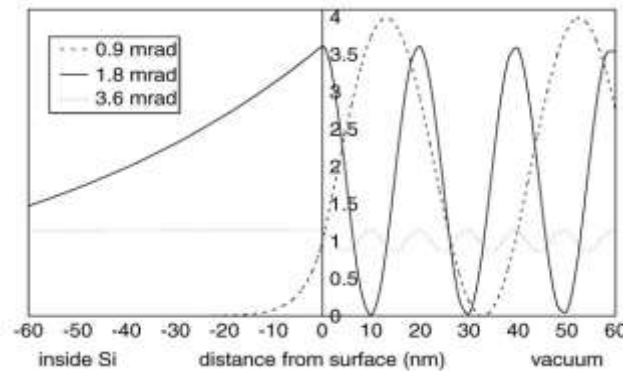
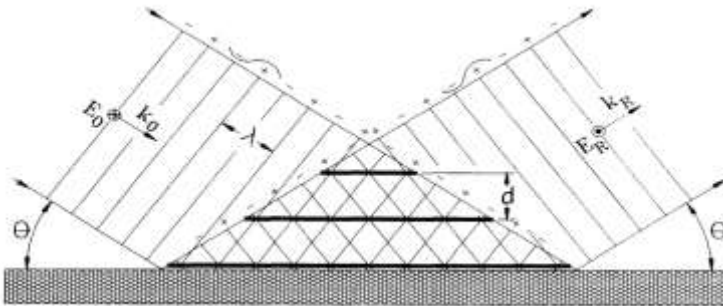
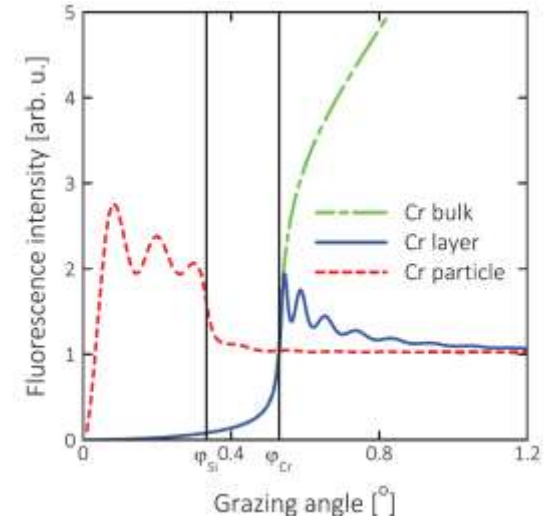
MSc Thesis

- Analysis of synchrotron data
- GEANT/PENELOPE MC simulations

GIXRF



Formation of X-ray Standing Wave (XSW) at grazing incident/exit angle



Electric Field Modulations above the surface

GIXRF/XRR as Characterization Tools for Patterned Hierarchical Nanoarchitectures

MSc Thesis

- Analysis of synchrotron data/Development of methodology
- Joint project with INN (E. Makarona)



1st Greek Summer School Synchrotron Radiation: properties & applications Thessaloniki | 5-8.9.2022



SCOPE

- 1st Summer School within the framework of Greece's participation in the ESRF
- Hosted by Aristotle University of Thessaloniki
- It will provide the necessary background on the properties and applications of synchrotron radiation
- It is addressed to post-graduate and PhD students, to post-doctoral researchers and fellows involved in industrial R&D as well as to senior researchers willing to expand their scientific horizons.

PROGRAM

- Hour-long lectures and afternoon lab-courses
- The tutors are experts in the field of Synchrotron Radiation.
- **Day 1:** SR properties & instrumentation | **Day 2:** X-ray diffraction | **Day 3:** X-ray spectroscopies | **Day 4:** X-ray Imaging
- Bring your laptop to work on real experimental data during the afternoon lab courses.
- Depending on Covid restrictions, this event may run in a hybrid mode with on-site and remote (zoom) participation.

VENUE

Center of
Interdisciplinary
Research and
Innovation
Building A

@photo: Kyriakos Gkogopoulos

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