

<b>Scientific supervisor</b>	
Name	Dr hab. Tomasz Kawalec
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Department	Department of Photonics
Laboratory	Laboratory of Cold Atoms near Surfaces
Group webpage	<a href="http://www.coldatoms.com">www.coldatoms.com</a> (currently under reconstruction)
<b>Proposed research topic</b>	
<i>Plasmonics – a tool for atomic physics and sensors</i>	
<b>Short description (&lt; 1000 characters)</b>	
<p>Depending on the student's interests and the state of the research in our laboratory, the student will participate in research based on plasmonics, and related to either cold atoms or ultra-sensitive sensors.</p> <p>Plasmonics is a field related to specific collective electron oscillations in metals, associated (in our case) with surface electromagnetic waves with interesting properties. The so-called cold atoms are groups of atoms slowed down by optical methods to very low velocities, well below 1 m/s, which corresponds to temperatures of several hundred microkelvins and less. The sensors in our laboratory are optical systems that allow one to study changes in a refractive index of a medium (like gas) in the range of <math>10^{-6}</math> and less.</p> <p>The student will have an opportunity to work in the laboratory in the field of atomic physics and optics. In particular, he/she will gain experience in working with a high or ultra high vacuum (UHV) system and a range of optical and optoelectronic devices, including lasers, acusto-optic and electro-optic modulators, etc. In addition, he/she will perform measurements with an optical near-field microscope (NSOM) or an atomic force microscope (AFM). The interested student will perform symbolic and numerical calculations in the Wolfram Mathematica software.</p>	
<b>Main research tool</b>	
Magneto-optical trap (MOT), near field microscope (NSOM)	
<b>Additional requirements to the candidate</b>	
<ul style="list-style-type: none"> <li>- interest in optics</li> <li>- interest in an experimental work</li> </ul>	
<b>Possibility to continue student internship in the form of:</b>	
Diploma thesis (master's or bachelor's degree)	x
PhD study	x