

Scientific supervisor	
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Department	Department of Experimental Computer Physics
Laboratory	Laboratory of Measurement and Control Systems
Group webpage	https://syspk.fais.uj.edu.pl/start
Proposed research topic	
<i>Measurement and analysis of extremely low frequency (ELF) EM waves</i>	
Short description (< 1000 characters)	
<p>Measurements performed in natural conditions (away from urbanized centers) in the range of EM waves with extremely low frequencies (0.1-300 Hz) provide a lot of information about the Earth's electrical activity, the state of the ionosphere, and conditions in near space.</p> <p>The currently used equipment uses magnetic antennas (solenoids), and the recorded signals have an amplitude of several hundred pico Tesla. Signal sources include: electrical phenomena occurring in the atmosphere (lightning), magnetic storms caused by changes in solar wind parameters, particle streams and waves in the ionosphere create the phenomenon of Alfvén waves resonance in the ionosphere (Ionospheric Alfvén Resonance - IAR), the signatures of which can be observed by recording and analyzing ELF waves.</p> <p>During the internship, the student will become familiar with the equipment and technique of recording ELF waves, will learn how to interpret measurement results, become familiar with previously used methods for analyzing ELF signals, and will also have the opportunity to implement their own ideas for analyzing and visualizing the results.</p>	
Main research tool	
A station for measuring extremely low frequency EM waves.	
Additional requirements to the candidate	
- basic knowledge of programming in any programming language	
Possibility to continue student internship in the form of:	
Diploma thesis (master's or bachelor's degree)	x
PhD study	x