Subjects for Master Theses

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Radioactive Source Localization Lab

More Information can be found at site: http://ailab.inp.demokritos.gr

or at the educational video:
https://www.youtube.com/watch?v=Xo-LDNK9yQ4&list=PLcNicqge3dtPV1C_FG2Ea7qhzbzyt7rEA&index=3

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1) Radioactive Source Localization by a Network of CZT Sensors

Main task: Localization of light shielded and/or moving sources

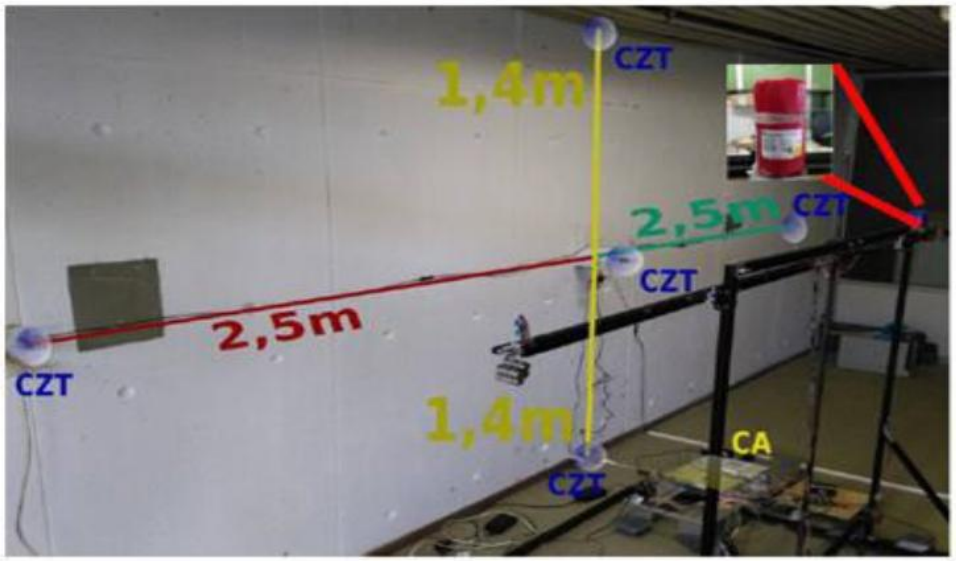

Figure 2 : Network of five radiation detectors in cruciform configuration and the light shielded (1cm of Pb surrounding the source) ^{137}Cs source used for test bed of the localization algorithms

Using Planar spectroscopic CZT sensor topology study the capability to localize Radioactive Sources in an open area using MVA techniques.

Candidate Profile:
1)Physicist/Engineer
2) Programming skills-> C++/ Java /ROOT

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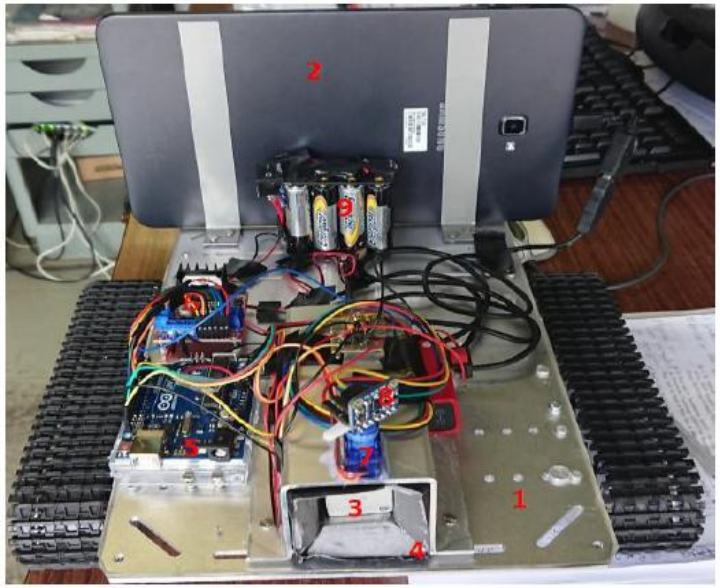
2)Radioactive Source Localization by an autonomous rover equipped with CZT Sensors

Main task: write a stand alone software in python to retrieve data from CZT sensor and analyze them



1. Rover Body
2. Tablet
3. Radio Sensor
4. Pb shield
5. Adruino Controller
6. Motor Driver
7. Servo Radar
8. LIDAR
9. Battery source

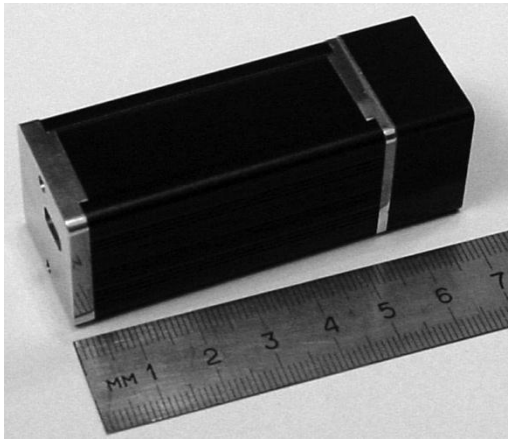


Figure 3: Semi-Autonomous rover platform equipped with radiation sensor

Candidate Profile:
1)Physicist/Engineer
2) Programming skills->
C++/ Java /python

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3) Simulation studies of Radioactive Source Localization by an Anger type camera.

Main task: Analyse simulated events of a Anger type camera with MVA techniques (Deep Neural Networks) to find the direction of the radioactive source

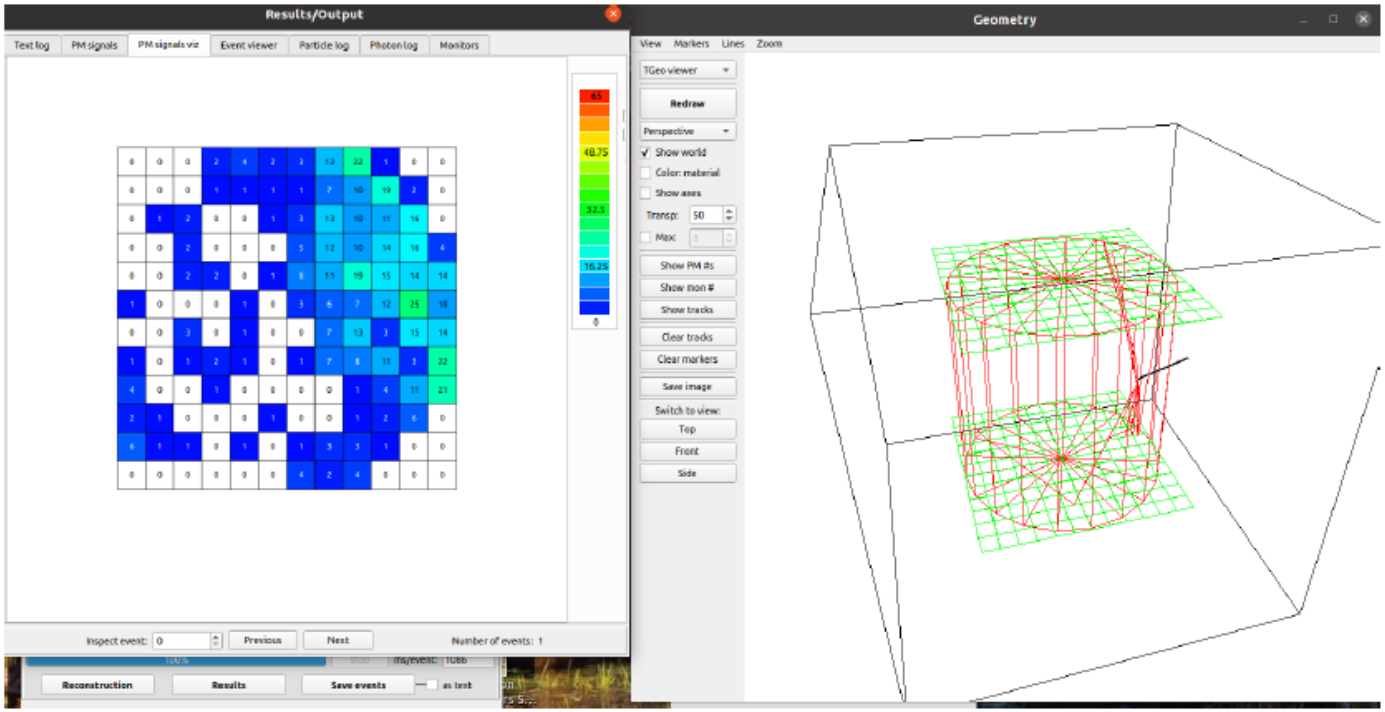

Figure 4: Simulation response of the NaILi crystal on a 122keV photon hit. It can be seen the direction of the photon can be reconstructed by the SiPM responses.

Candidate Profile:
1)Physicist/Engineer
2) Programming skills->
C++/ROOT/python

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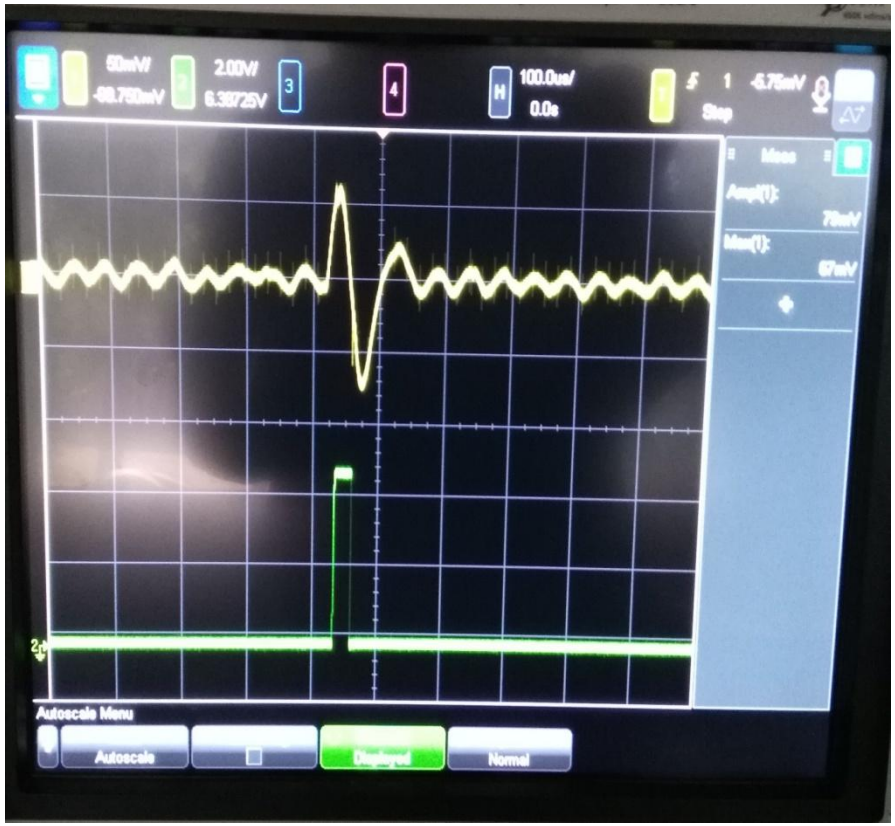
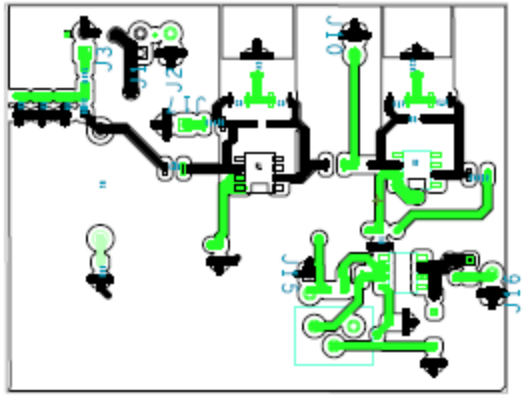
4) Low-Cost Radiation detectors

Main Task: Design Low noise board + evaluation software





Candidate Profile:
1)Physicist/Engineer
2) Programming skills-> Cadence/Orcad/Pspice simulation packages

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