LUNACAL: an Electromagnetic Lunar Calorimeter

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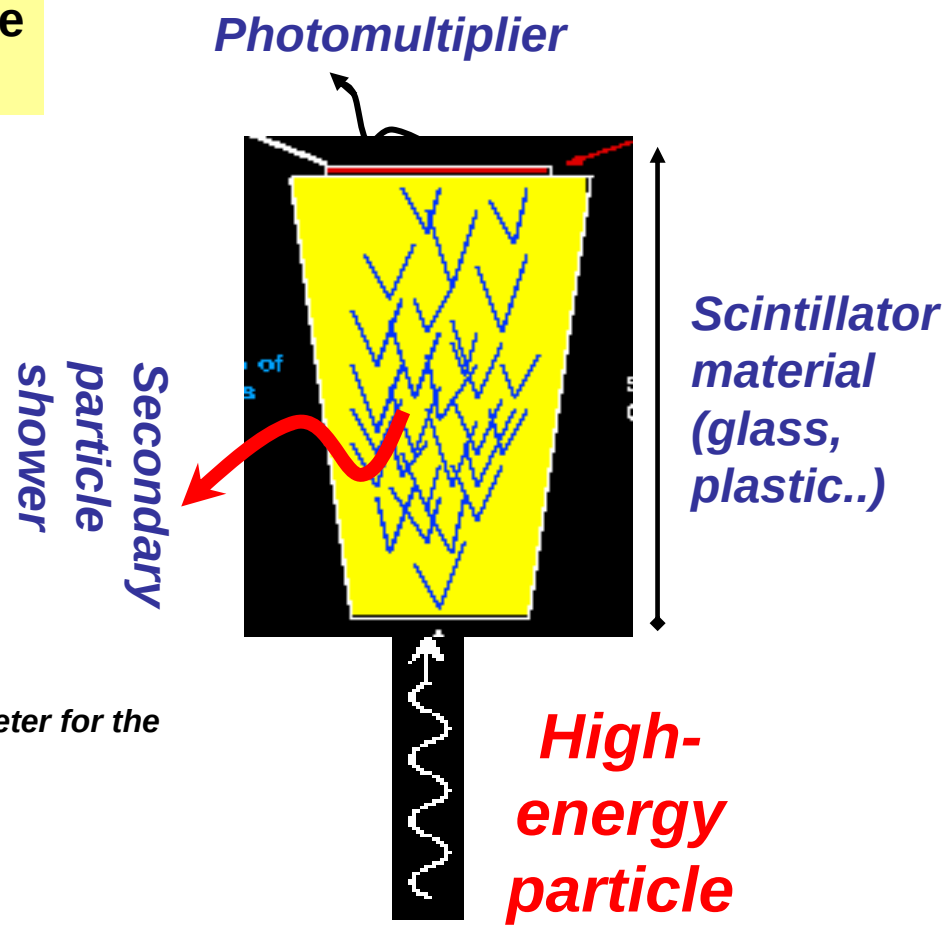
Lunar Calorimeter

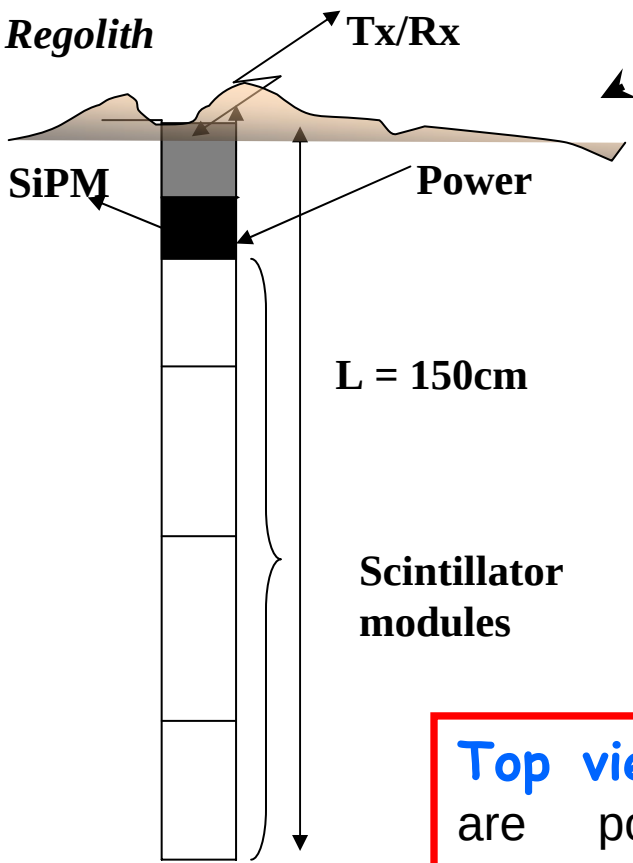
Science theme: Observation of the Universe from the Moon

•To be installed on lunar soil to measure the high energies of γ rays (100 GeV up to 10 TeV) impacting on the Moon.



[1] Brunetti M. T. (INFN-Perugia): A Moon calorimeter for the detection of very high energy gamma rays

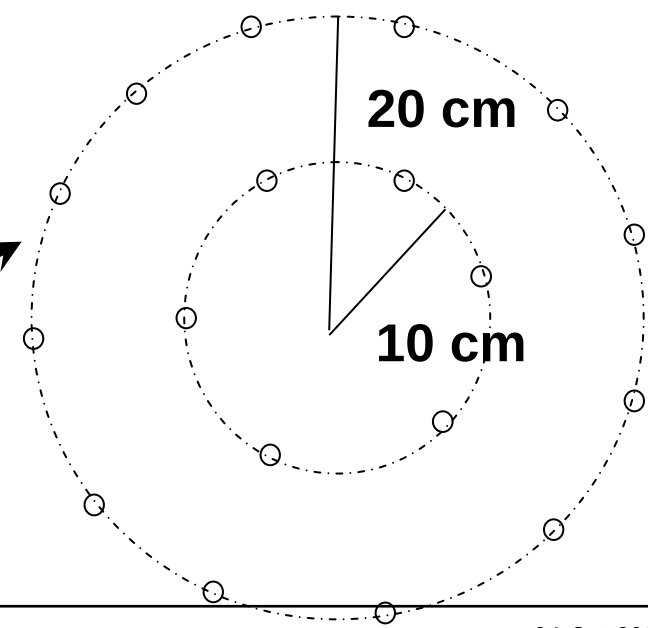
LUNACAL payload (I)



Single bar

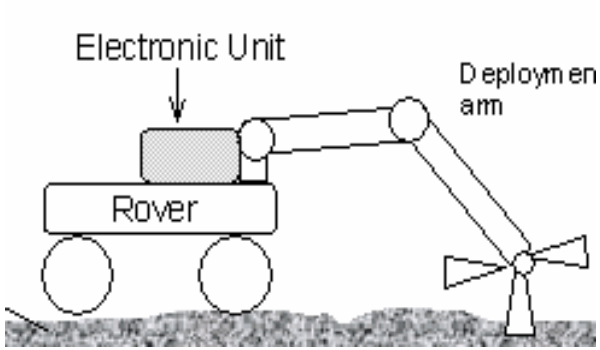
The scintillator with the readout electronics and the Tx/Rx system is placed in proper location after the extraction of the regolith carrot.

Top view: the bars are positioned in concentric circles.



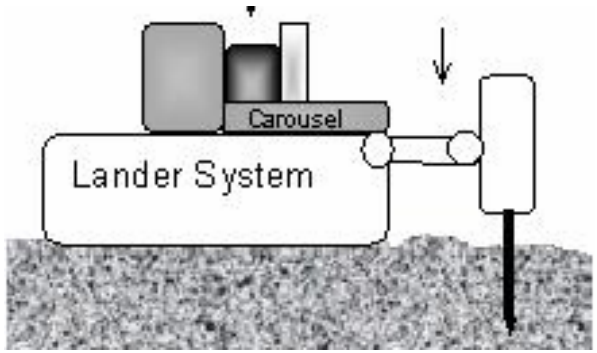
Installation scenarios

Rover



High number of bars to install on the Moon surface

Lander



Lower number of bars to install (function of the maximum extension of the robotic arm).

→ The number of bars to install shall be defined according to the mission scenario.

Technical Budgets

Mass budget → The total weigh of each bar (scintillator modules + case + readout electronics + Tx/Rx systems) is estimated to be ~ *300 g*.

Power budget → in operative condition the required power for each bar is less than 10 W. Two options are possible for the power supply design, currently under study:

1. power supply provided by solar cells → in this case each active bar shall be equipped with its own solar panel
2. power supply provided by a direct cabling to the lander.

Data volume → the data volume for each bar is estimated to be ~ 240 bit/event