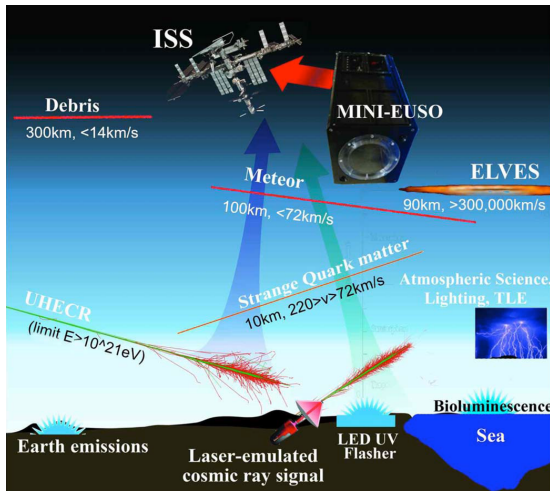


Modelling of space & ground-based observations of meteors and exotic matter



SUMMARY.

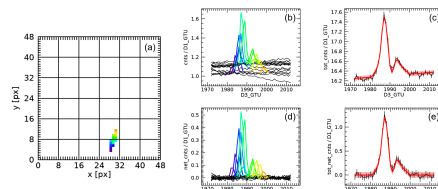
Objective of the METEOR is a full immersion in the topic of transient luminous events of extraterrestrial origin. Different kinds of phenomena will be investigated, ranging from meteor events to the detection of the transit of exotic matter in the atmosphere. Approximately one week will be devoted to lectures covering the theoretical background of the covered topics. A significant fraction of the time will be devoted to numerical simulations and data analysis. Whenever possible, some time will be devoted to laboratory experiment activities. The methodology will be applied to the analysis of Mini-EUSO, PRISMA or DIMS data. Mini-EUSO is a space experiment on board the ISS, PRISMA is a network of ground-based full-sky cameras in Italy while DIMS is a set of CCD camera in Japan and US. The three experiments aim at detecting meteors and/or fireballs, and search for interstellar meteoroids and exotic matter.

OBJECTIVES

- **Knowledge**, understand planetary science, learn about the dark matter problem and observational methodologies
- **Skills** run numerical simulations, process Mini-EUSO, PRISMA or DIMS data

analyze the data acquired by Mini-EUSO, PRISMA or DIMS projects as well as simulate the expected signals in the detector by meteors or exotic matter.

The figure shows an example of extraction of the meteor signal from the data after polishing the background noise



Example of processing a meteor signal.

- Theory grade [30%]
 - 50%: theoretical questions, base calculus from lectures
 - 50%: critical spirit
- Practice grade [30%]
 - Project-related exercises (10%): thought-process and results
 - Project (90%): initiative, progress, analysis
- Defense grade [40%]
 - Oral and slides quality
 - Context
 - Project / Personal work
 - Answers to questions

INSTITUTE

- Department of Physics, University of Turin
- Institute URL
- Via P. Giuria 1, Turin, Italy

THEORY

by BERTAINA MARIO EDOARDO

Explain the theoretical aspects covered in the METEOR and the observational methodology.

by BARGHINI DARIO

Presentation of the meteor observation techniques and the importance of meteor studies in the framework of planetary science.

APPLICATIONS

by D. BARGHINI/ M. BERTAINA

The trainee will use and possibly improve available numerical codes to

MAIN PROGRESSION STEPS

- Week 1-2: lectures on the covered topics and bibliographic studies
- Weeks 3-8: project
- Week 9: preparation of the final presentation and discussion

EVALUATION

The students will be examined by means of a final presentation which will be delivered on the last week. This presentation should include all the items discussed in the following.

BIBLIOGRAPHY & RESOURCES

Any reference or web page that students can read to have a better idea of the topic

- Bertaina-webpage
- Mini-EUSO-project
- Mini-EUSO-video
- Mini-EUSO-paper
- PRISMA-website-ITALIAN
- PRISMA-paper
- DIMS-paper

CONTACT

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