

ISAPP 2012 lecture: Astroparticle in space

Space particle detection was the objective of the very-first “pre-spatial” experiment in 1912 by Victor Hess. In the early sixties, when space became accessible, this science case led many of the first space missions, either with suborbital rockets or with satellites, and it has been paving a large part of space programs up to now. This history is illustrated via a sample of former and present space missions. The reasons for going to space are presented, together with the peculiarities of this environment and the consequences on detection experiments. A glance at the particular case of stratospheric balloons. Then a few “lessons learnt” for the design of an astroparticle space mission are highlighted. The present programmatic context and perspectives for space missions in astroparticles concludes the course.

1. Astroparticle in space : a brief survey

2. Why going to space?

2.1 The atmosphere

2.2 Large scales

2.3 Large acceptances

3. Constraints on a space mission

3.1 Format constraints

3.2 The environment(s) a space experiment has to face

4. Stratospheric balloons

4.1 Why a balloon experiment?

4.2 Limitations

4.3 Examples

5. Preparation of a space mission : a few lessons learned

5.1 Modelling and simulations

5.2 R&D's activities

5.3 The importance of a “system” approach

5.4 International collaborations

6. Present context and perspectives of space programs