

Fundamental Physics Roadmap Advisory Team (FPR-AT)

ESA's Fundamental Physics Roadmap

Call for White Papers

Mandate of the FPR-AT

The FPR-AT has been assembled by ESA in order to draw a recommendation on the scientific and technological roadmap necessary to lead Europe toward the realization of future space missions in the framework of the Cosmic Vision 2015-2025 plan in the field of fundamental physics. The following scientific fields are expected to be covered:

- tests of fundamental laws and principles e.g. equivalence principle, constancy of constants, inverse square gravitational law;
- detection and study of gravitational waves ;
- quantum mechanics in a clean environment;
- cold atom physics, new frequency standards and quantum technologies;
- the fundamental physics of dark energy and dark matter ;
- space-based efforts in astroparticle: high energy cosmic particles, antimatter,...

The FPR-AT will focus on space-based applications but will also take into account current and future progress being made or likely to be made from ground-based installations and instruments. The FPR-AT has been convened by ESA for a duration of approximately one year, with a mandate extending to March 2010. The FPR-AT will work in strict coordination with the FPAG, ESA's Fundamental Physics Advisory Group.

Context for the White Papers

The FPR-AT has the task of consulting the broad scientific community on this issue and of preparing a recommendation to ESA on the best scientific and technological roadmap to lead Europe toward these goals.

The present "Call for White Papers" is the first step in this consultation process. Detection and study of gravitational waves, as well as the nature of Dark Energy are fully germane to the topic but are already covered by ongoing mission studies in the framework of the Cosmic Vision 2015-2025 plan, hence no White Papers are solicited in those areas. White Papers may, on the other hand, take into account the technological developments achieved, or needed, for these missions.

The brief of the FPR-AT is to deliver a report covering the following points:

- 1) long-term scientific goal(s) for fundamental physics;
- 2) intermediate scientific goal(s) toward the same long-term goals;
- 3) a survey of the extant and planned facilities useful to achieve the scientific goals mentioned above, both space- and ground-based;

4) scientific goals among the ones mentioned above likely to be achieved with extant or planned facilities;

5) future facilities (not covered under point 3) needed to achieve the goals listed under points 1) and 2);

6) technologies needed for the establishment of the future facilities under point 5)

The roadmap should consider and include among the intermediate scientific and technological goals the relevant "milestones" where applicable, i.e. intermediate goals which must be achieved before the longer-term goals can be considered feasible.

The purpose of this "Call for White Papers" is to solicit inputs from the scientific community (as well as from any other interested party) on any of the elements which the FPR-AT will consider in its report.

Boundary conditions for the White Papers

The FPR-AT will use the White Papers in their deliberations and in the preparation of their final report and suggested strategy. In this process, they may or may not refer to the authors of the White Papers, as well as include sections of the White Papers verbatim. No confidentiality will be respected in this process, and the submitted White Papers will be considered public material. The FPR-AT may later decide to consult or interview some of the White Paper authors' in the drafting of its final recommendations.

White Papers could describe scientific studies, ongoing technological developments, measurements with existing facilities, new instruments, new facilities or space missions, needed technological developments, considerations from theoretical modeling, or any other recommendations or information that can support the FPR-AT in its work. The FPR-AT will focus on the scientific goals that need to be addressed in a general and specific way and on the necessary techniques; it will not assemble a complete implementation plan of specific space missions. The present Call for White Papers does not replace, or in any way preempt, the normal Calls for Proposals that are issued by ESA in the context of the Cosmic Vision Plan.

White Papers should indicate why a particular approach is relevant to the brief of the FPR-AT and to the points to be addressed in its report, as well as to ESA's Cosmic Vision Plan. Each concept should be described in a separate self-explanatory paper (no reference between separate White Papers except in the abstract). It will be up to the responsible author to include and make the necessary balance between text and figures. The author should also have received the necessary permissions for any art incorporated in the White Paper. ESA reserves the right to use any original art in the final report of the FPR-AT with due credit to the provider of the figure.

White papers are solicited both from individual scientists and from teams. A given individual author or team is allowed to submit more than one White Paper. White papers

must not exceed 10 A4 pages in length and must be written in a font not smaller than 10 pt in size. The page limit includes all figures, tables, references, and appendices. White Papers should include a cover page, containing the title, authors and an abstract of maximum 20 lines.

Submission process and deadlines

The white papers should be submitted electronically in PDF format using the form available at http://sci.esa.int/fprat_call. The maximum file size can be 10 Mbyte.

The deadline for receipt of the white papers is 12:00 hours (noon) CEST on 28 May 2009.

Further information on the FPR-AT for this mandate:

The FPR-AT brief and its membership, as well as future documentation pertaining to committee activities, can be found at http://sci.esa.int/fprat_call

Further information on this Call for White Papers:

Questions on the present Call for White Papers should be sent by electronic mail to Timo Prusti, ESA's Coordinator for Astronomy and Fundamental Physics Missions (Timo.Prusti@esa.int)