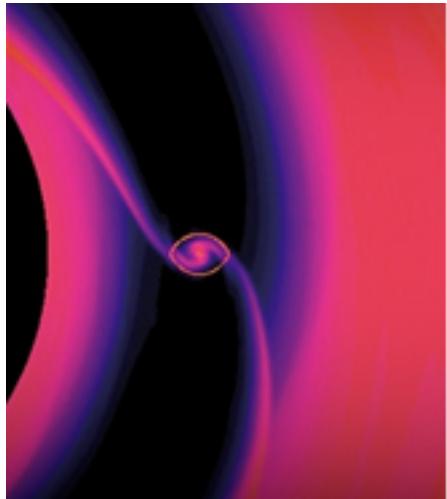




## Paths of Discovery



The Council of the Pontifical Academy of Sciences suggests devoting the November 2004 Plenary Session to the following topic: 'Paths of Discovery'. This topic is of interest not only to scientists but also to many other people, including political and economic leaders. The Council is therefore asking for feedback, especially from those members of the Academy who are considering presenting a paper. A tentative title of the proposed paper would be appreciated and any critical or constructive suggestions would be welcome. Discoveries are at the basis of new knowledge. There is no single recipe leading to discovery; there are a multitude of paths. Some discoveries are made upon verification or falsification of a theory. The discovery can then also give rise to a refinement of the theory, paving the way for further experimental approaches. Quite frequently, a discovery is made while the researcher is looking for something else. His scientific mind and intuition may thereby direct his attention to the unexpected. This source of discovery is generally called serendipity. Novel methodology and research strategies can open the doors to many new discoveries, which can then have an impact on individual researchers or, in other cases, on wider research programmes involving many researchers. Think of major scientific endeavours such as CERN depending on a large experimental set-up. However, in this case too progress will depend in part on the activities of individual scientists and their aptitude to design and interpret experiments. The same is true for almost any research, whether it is carried out by a single person or in the context of a larger research programme. More generally, the debate may also address the role played by dogma and widely anchored textbook knowledge in scientific progress, given their frequent influence on the interpretation of observations and experimental data. The aim of a debate on 'Paths of Discovery' would be to collect a number of case studies largely based on the personal experience of the participants and their scientific environments. However,

the debate may also refer to some cases of discovery that have already been documented by the history of science. The resulting documentation is expected to illustrate the range of paths leading to discovery. Such documentation may be useful in political planning for scientific investigations and may represent a welcome contribution to the literature on the principles of the scientific approach.

Werner Arber