



## **European Physical Society: Position Paper**

### **National Support for Research in Physics**

The European Physical Society (EPS) is an independent body funded by contributions from National Physical Societies, other bodies and individual members. It has over 80,000 members and can call on expertise in all areas where Physics is involved. The declared aim of the EPS is to help Physics and Physicists in Europe.

#### 1. The Object of this Position Paper

It might appear that the case for Government support for Research in Physics (both Pure and Applied) is self-evident, but experience has often shown that this area is not accorded the high priority that should be due to it.

The present 'Position Paper' gives a balanced case for appropriate support; it is addressed to those who have the responsibility for National Support for Physics.

The important role of research in private industry and in individual Government Departments (e.g. in Defence) is not considered here.

#### 2. The Impact of Physics

The impact of earlier research in Physics on the everyday life of citizens is very considerable. The use of electricity, methods of communication, medical techniques and many other examples all stemmed from fundamental research in Physics and related disciplines. The discovery of the transistor is a further example; the impact on all areas of electronics has been considerable, by way of miniaturization, speed, efficiency, etc.

More recently one can include lasers, nuclear magnetic resonance and X-ray imaging in the medical field and there are many other areas, too, where Physics is making a crucial input. We can guarantee that such applications will continue.

#### 3. The International Dimension

Research is an international activity and each country has its own part to play. Prowess in research is one of the 'hall marks' of an advanced (or advancing) nation. (see Appendix). The cultural aspect of Physics should also be included - a knowledge of Physics is part of the general education of a nation. Added to this is the need for every nation to have local 'experts' to understand and explain to society the newest scientific achievements, wherever the discoveries have been made.

#### 4. Pure and Applied Physics

A balance of Government support between Pure and Applied Physics research is necessary. Although the time interval between the results from Pure Physics research and its eventual application can be long, there is almost always an application of some sort, often in an unexpected direction.

More immediate is the use of the techniques developed in Pure Physics research in other areas; the application of techniques should not be underestimated.

5. The Training Aspect

The training element of Physics research cannot be overstated - students trained in Physics research find employment in many professions, including, increasingly, business and finance.

The training of scientists to the level of Ph.D. of an international recognised standard also provides the manpower needed to create a national industry for technologically advanced products.

The provision of good education in Science and the presence of a large number of highly skilled scientists in a nation, with the associated presence of high quality universities and research laboratories, prevents the 'brain drain' of talented individuals. It also makes home institutions more attractive to foreign investment.

6. National Needs

Applied research can often be finely tuned to the needs of a particular country. Some support can be provided by Industry but again most must be Government-provided. Problems with energy sources and the environment are obvious examples where Government-sponsored research is essential.

7. A Strong 'Science Base'

Although some research techniques can be acquired (purchased) from other Countries, most can not; a strong national 'Science Base' is a fundamental requirement for their development.

8. Political Aspects

The knowledge that a Nation has such a Science Base and one that is stable, despite fluctuating national income, coupled with the advice provided by that Base, is an important contribution to success in 'political' deliberations between nations. A strong Base also enables the participation in and hosting of valuable international ventures.

9. National Confidence

Discoveries by a nation's physicists can add to the confidence and pride of the nation's citizens.

10. National Research Institutes

The division of research effort between Universities and National Research Institutes is the subject of another Position Paper but it can be stated here that both are needed.

Appendix    Participation in International Laboratories

There is considerable value in a Nation being associated with an International Laboratory (CERN, ILL, ISRF, ESA, etc.). The access to superlative techniques and sophisticated and often fundamental experiments is invaluable. The techniques learned can often be used at home and, on a different plane, national prestige is enhanced.

The funding situation must be handled with care, however. The inevitable significant 'subscription' - in money or in kind - must be taken from a separate Government fund. Furthermore, the domestic Science Base must be enhanced to cover the extra cost of *using* the international facility (e.g. detectors for experiments).

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