



## André Blanc-Lapierre



Lavaur, France, 7 July 1915 - Châtenay-Malabry, France, 14 Dec. 2001

**Title** Professor of Physics, University of Paris-Sud Orsay and  
Former President, Académie des sciences, Paris, France

**Field** Physics

**Nomination** 17 Apr. 1978

**Commemoration** – André Blanc-Lapierre received his first education in an 'Ecole Primaire Supérieure' and at the end of this scholarship, he got a 'Brevet Supérieur'. He was an excellent pupil and he joined the classical lycée, to obtain first his 'Baccalauréat' and then became a student of the 'Ecole normale supérieure'. The special upbringing he received in his family and his training in these schools gave him distinct characteristics, very elegant handwriting and other very good habits in organizing his life and work. After graduating from this last school, his scientific activity may be described by four periods. The first one covers approximately the decade 1940-1950. He joined the Physics laboratory of the Ecole normale and prepared a thesis under Georges Bruhat's supervision. His dissertation, accomplished in 1944, was devoted to the study of the shot noise and to its influence on the measurement and amplification of very small photocurrents. The existence of background noise was known; but it was not known at that time how it would be possible to give a description that went further than a qualitative one. He was the first to be convinced that, to make progress in understanding the phenomenon, it would be necessary to use the tools provided by probability theory. But at that time the concept of stochastic processes was not known. He started to attack the problem and his analysis was so successful that he was in the position to uphold a new dissertation and to add a second doctorate, in Mathematics, to the one he had achieved in Physics. It is exceptional in France for anyone to have two science doctorates in two different fields. This work was the starting point of a great number of papers devoted to stochastic processes applied in various domains of physics and information theory. In 1953, with his colleague Robert Fortet, he published a book of seven hundred pages on random functions which shortly became a classic. The second period is roughly the decade 1950-1960. He was then Professor of Physics at the University of Algiers. He founded a theoretical physics laboratory; a very active one. He encouraged young physicists to explore new areas where probabilistic methods could be applied. Among many developments, his suggestion to transpose to optics ideas known in radioelectricity deserves to be mentioned. He was the first to show that the concept of coherence in optics must be described by using appropriate correlation functions. His papers written in French remained unknown and the validity of his ideas became clear later with the development of lasers and coherent optics. The third period covered approximately the decade 1960-1970 and was mainly devoted to nuclear physics. In fact, it started at the end of the previous one, with the creation in Algiers of an 'Institut de Physique Nucléaire' which was, for Blanc-Lapierre, the occasion to show his talents for managing such an operation. It was on the basis of his achievement there, that he was chosen as director of the linear accelerator-lineac of the faculty of Orsay in 1961, succeeding Hans Halban who had just resigned. First, he decided to upgrade the electron lineac energy from 1 GeV to 2.3 GeV, thus allowing the undertaking of K meson experiments. Moreover a positron beam was set up, a facility that proved to be crucial for the storage rings to come. Then he proposed in 1962 to start work on electron-positron collisions which presented great technological challenges which had to be faced. Two years later, such collisions were observed for the first time in a storage ring. In 1964 he invited a group of bubble chamber physicists, led by André Lagarrigue, who were working at the Ecole polytechnique, to move into his laboratory. Then jointly with this school, CEA Saclay and the CERN, the Orsay laboratory of Blanc-Lapierre participated in the Gargamelle bubble chamber program under the leadership of André Lagarrigue. This heavy liquid chamber turned out to be the most effective in neutrino interactions and allowed the famous discovery in 1973 of neutral currents. During the last period he was the director general of the 'Ecole supérieure d'Electricité'. He showed, once again, his talents as high

class administrator and manager. He succeeded in expanding the number of buildings for the school and its developments. Moreover he gave a great impulse to research in this school, in particular by the creation of a new laboratory in cooperation with the CNRS: the 'Laboratoire des signaux et systèmes' where he was working until his retirement. André Blanc-Lapierre was a tireless worker who had a fantastic level of activity. He liked to build new schools, new offices, new laboratories for his students, his co-workers and for the people involved in the activity he was running. He was a very good supervisor, always available for those who needed help or advice. He was one among a few scientists who have contributed to the renewal of science in France. He was ready to take on successfully high responsibilities, for instance as the President of the most important Committee in the sixties, in charge of the preparation of Government decisions concerning the scientific development, its budget and its organization. Member of the French 'Académie des sciences' since 1970, he played an important role in 1983 in the creation of the CADAS, 'le Conseil des Applications de l'Académie des Sciences', which has recently become autonomous under the name of French 'Académie des Technologies'. He was President of the French Academy in 1985 and 1986, a very active one who brought many improvements to its organization. He was elected to the Pontifical Academy of Sciences in 1979 and was a very active member, as member of the Council and also as the leader of a very successful study week on energy. When he accepted a responsibility, he would take it on fully. André Blanc-Lapierre was a warm personality, very open minded, very helpful to everybody. He was very attached to our Academy, very happy to be able to work for its development. This good Christian was convinced that our Academy would have a very important role in making science better understood and appreciated by the Church.

Paul Germain

### **Most important awards, prizes and academies**

Grand officier de l'Ordre National du Mérite (1989); Grand officier de la Légion d'Honneur (1992). Président du Comité Français de Physique (1969), de la Société Française des Electriciens (1971), de la Société Française de Physique (1981). Membre de l'Académie des Sciences, Paris (depuis 1970). Président pour 1985 et 1986. Président du Conseil Supérieur de la Sécurité et de l'Information Nucléaires (1987-1990).

### **Summary of scientific research**

1) Orientation générale: L'oeuvre scientifique de A. Blanc-Lapierre comporte un domaine permanent: celui de la transmission et du traitement de l'information, de la détection des signaux et un domaine dans lequel il a travaillé une douzaine d'années environ: celui de la physique nucléaire et de la physique des hautes énergies.

2) Principaux travaux: a. Communication et information: Contribution au développement des ondes centimétriques après la guerre de 1940-1945 et, spécialement, étude et réalisation de tubes à ondes progressives en collaboration avec P. Lapostolle; Recherches sur l'amplification de courants photoélectriques très faibles et mise au point de récepteurs de grande sensibilité; Théorie de l'information et applications. Application à l'optique des résultats de la théorie de l'information. Traitement du signal en acoustique sous marine avec application au Sonar. b. Calcul des Probabilités et Applications: Etude des fonctions aléatoires (en partie en collaboration avec R. Fortet, A. Tortrat et B. Picinbono) et application des résultats obtenus dans ce domaine à des problèmes de physique (fluctuations en électronique, cohérence en optique, mécanique statistique, ...), aux techniques de communication et à la théorie des systèmes (applications à l'automatique, ...). c. Physique nucléaire et physique des hautes énergies: A. Blanc-Lapierre a joué un rôle déterminant dans la décision de construire l'anneau de collisions d'Orsay à électrons et positrons A.C.O. (énergie maximale de 600 MeV, intensité de chacun des faisceaux pouvant dépasser 15 milliampères, durée de vie des faisceaux stockés atteignant 24 heures), et suivi de très près sa réalisation, qu'il confia à Pierre Marin (1963-1968). L'utilisation de la focalisation forte, pour la première fois dans ce type de machine, a donné à cet anneau des caractéristiques extrêmement utiles qui ont permis d'obtenir des résultats intéressants en physique des particules, concernant plus précisément les mésons vecteurs. A.C.O. a, de plus, été largement utilisé en physique atomique et en spectroscopie comme source de rayonnement synchrotron.

### **Main publications**

Blanc-Lapierre A.J., *Electronique Générale* (G. Goudet et P. Lapostolle). Eyrolles Editeur, Paris, 1953; Blanc-Lapierre A.J., *Théorie des fonctions aléatoires – Applications à divers phénomènes de fluctuations* (R. Fortet). Masson Editeur, Paris, 1953; Blanc-Lapierre A.J., *Méthodes mathématiques de la Mécanique Statistique* (P. Casal et A. Tortrat). Masson Editeur, Paris, 1959; Blanc-Lapierre A.J., *Propriétés statistiques du bruit de fond* (B. Picinbono). Masson Editeur, Paris, 1961; Blanc-Lapierre A.J., *Mécanique Statistique*. Masson Editeur, Paris, 1966; Blanc-Lapierre A.J., *Fonctions Aléatoires* (B. Picinbono), 1981.