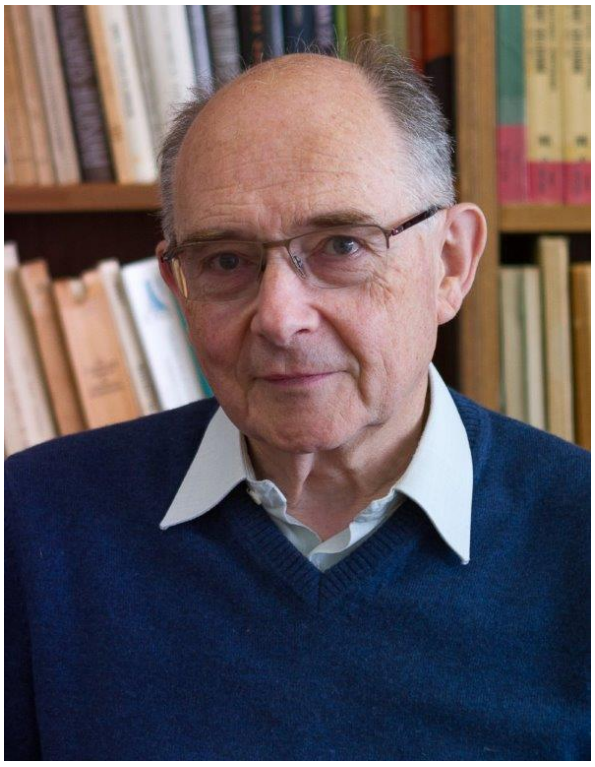
André Lagarrigue Prize 2016

Bernard Degrange, Directeur de Recherches Emeritus, has been awarded the 2016 André Lagarrigue Prize. Co-financed by the CNRS, the University Paris Sud, LAL, Ecole Polytechnique, CERN and CEA, with the support of the French Physical Society, the prize was created in 2005 in honor of Professor André Lagarrigue, director of the Linear Accelerator Laboratory (LAL) from 1969 to 1975, who had a leading role in the discovery of weak neutral currents in the Gargamelle bubble chamber experiment at CERN, thus establishing the validity of the electroweak theory.

Born in 1941, Civil Engineer of the Mines, Bernard Degrange joins the laboratory of Louis Leprince-Ringuet in 1964, in the group of André Lagarrigue and André Rousset. From his earliest years, he collaborates with his illustrious elder, whose visionary sense of physics he shared, together with his willingness to transmit his knowledge to the younger ones. After his thesis in 1969 on the decay modes of the η^0 mesons, B. Degrange joins the Gargamelle collaboration and devotes himself for ten years to the neutrino physics. He works initially on "charged current" interactions and in 1972, he presents the first results on the ratio of the neutrino and antineutrino cross sections on nucleons. He continues his work on the differential cross sections and the structure functions of the nucleon. He analyzes the Gargamelle data under the various conditions of the experiment: chamber filled with heavy freon or propane, neutrino beams produced by the CERN PS and then by the SPS. The contributions of B. Degrange, on exclusive channels produced in neutral current or charged current interactions, or on the production of charmed particles, demonstrate the originality of the methods that he develops.



In 1979, he joins R. Barloutaud (CEA Saclay) and S. Jullian (LAL Orsay) to design and then realize an off-accelerator experiment to look for hypothetical proton disintegration. He is responsible for the X-LPNHE group (Ecole Polytechnique), in charge of the data acquisition and of part of the electronics of the calorimeter for the detector installed in the underground laboratory at Modane (LSM). In the early 1980's, B. Degrange becomes interested in cosmic radiation, its origin and its composition at high energies.
B. Degrange foreknows the wealth of this domain, then very little explored, and he will no longer leave this field, successively devoting his work to several experiments of very high-energy gamma astronomy. Aware of the weaknesses of the detectors at the time, he engages himself in 1992 in the development of imaging telescopes of high granularity with fast electronics. CAT's results on the Crab nebula, of which B. Degrange is a main author, and the discovery of four other "blazars" confirm the relevance of the options chosen. For the

simultaneous observation of gammas and X-rays during the major bursts of these extragalactic sources, B. Degrange is awarded the silver medal of the CNRS in 1997.

As early as 1998, as a result of his experience in CAT and his contacts with HEGRA collaborators, B. Degrange contributes to the design of the HESS experiment, which combines the advantages of both types of detection: rapid high granularity imagery and stereoscopy. At the end of 2001, he leads the astrophysics group of the Leprince-Ringuet (LLR) laboratory at the Ecole Polytechnique. The group is then in charge of the construction of the mechanics of the HESS camera, and it participates in the construction and testing of the calorimeter of the GLAST (Fermi) space project. The exceptional results of HESS on extragalactic sources of very high-energy gamma radiation demonstrate the soundness of the principles of its design. With the deployment of HESS II and the exploitation of data from the large 28 m telescope, the increased accuracy of observations meets the expectations of the visionary pioneer as was B. Degrange in the domain of gamma astronomy in the 1980's.

In 2000, the in2p3 Director entrusts B. Degrange with the responsibility of an interdisciplinary research group (GDR), "Cosmic Phenomena of High Energy", intended to regroup the efforts of several CNRS departments and the CEA in high energy astrophysics. The participation of INSU groups in the HESS experiment is a direct consequence of this. The mission of the GDR, which promoted working groups, symposia and schools, and concluded with a prospective report, is now entrusted to a national program of INSU.

Willing to share his knowledge, B. Degrange has supervised numerous internationally recognized theses, and from the very beginnings of gamma astronomy, he has been invited to introduce non-accelerator physics at multiple conferences and schools. B. Degrange also took charge in 1966 of the general physics course at the Ecole des Mines in Paris, which edited his lecture on quantum physics. B. Degrange skillfully addresses less educated audiences or physicists from other disciplines, and he is the author of articles in the Bulletin de la Société Française de Physique and the Comptes Rendus de l'Académie Sciences, as well as general public magazines.

In acknowledgement of his exemplary career, in line with that of his illustrious elder, the jury awards the André Lagarrigue Prize 2016 to Bernard Degrange with the liveliest pleasure.