



IN MEMORIAM

René Pellat
Professor of Physics and Astronomy
Los Angeles
1936–2003

Professor René Pellat passed away on August 4, 2003 at the age of 67. After being a frequent visitor to UCLA for nearly 20 years, Professor Pellat joined the faculty in 1989, spending a part of the year in residence at UCLA while continuing an increasingly distinguished career in France. Professor Pellat's scientific accomplishments are legendary, placing him at the pinnacle of theoretical plasma physicists. Together with Professor Guy Laval, in the late 1960s and early 1970s René founded the discipline of modern plasma physics in France, and at l'École Polytechnique established a world class theoretical program in the physics of high temperature plasmas with applications to magnetically and inertially (laser) confined thermonuclear fusion plasmas, space plasma physics, and plasma astrophysics. In the 1980s and 1990s, as his career evolved with his assumption of many very high level administrative positions in France, René remained fully engaged in science through both his own research and his frequent interactions with the many young students whom he trained.

Professor Pellat's international scientific reputation was secured with his early work in fusion. With M. N. Bussac and Laval, in the 1970s René pioneered in the investigation of internal kink and ballooning modes in Tokamaks using collisionless plasma kinetic theory in general magnetic geometries. Later with J. F. Luciani, he participated in the development of a very sophisticated magnetohydrodynamic simulation code to study these instabilities. Although always a penetrating critic of both the experimental and theoretical fusion programs, René remained dedicated to the goal of achieving a sustainable fusion energy source. During the last years of his life, virtually single handedly, René brought together an international consortium (Europe, Japan, China, Canada, and the U.S.) to resurrect the ITER project – a large Tokamak which is intended to approach break- even conditions.

After co- authoring the classic paper on the collisionless tearing instability, in 1966 René joined with Laval and Professor Bruno Coppi to suggest that the tearing mode was responsible for the magnetic field reconnection in the geomagnetic tail that initiated magnetospheric substorms. In the 1970s he began training students in space plasma physics, and co- authored seminal papers on VLF triggered emissions with A. Roux, the kinetic structure of thin current sheets with P.H. Francfort, electron beam instabilities produced in the ionosphere by active rocket experiments with J. Lavergnat, and the generation of auroral kilometric radiation with D. Le Queau and A. Roux. By the late 1970s and early 1980s, with the analysis of the tearing instability in weakly magnetized current sheets with B. Lembège, René realized that the original tearing model could not explain the complex phenomena associated with the onset of substorms, and started a long- term research effort to understand the plasma stability and dynamics of the near- Earth region of the geomagnetic tail. A milestone in that program was the beautiful UCLA Ph.D. dissertation of Omar Hurricane. Even after administrative duties had come to consume most of his time, whenever he had a few spare moments, René continued to pursue the problem of substorms by carrying out amazingly complicated calculations.

René had a profound impact on French theoretical astrophysics by training students who then established research groups (with René as the grey eminence) in plasma astrophysics, planetary formation, and cosmology. With E. Asseo, he constructed a model for beam- excited radio emission in the superstrong magnetic fields of pulsars. After they developed a nonlinear mode coupling theory for the generation of galactic spiral arms, M. Tagger, J. F. Sygnet, and René demonstrated, in a tour de force of classic French

mathematical analysis, that the standard Lin- Shu theory of spiral density waves also contained the heretofore unexplained bar modes. René's last paper (Ap.J., June, 2004 with Tagger) concerned the magnetically driven instability of the microquasar's accretion disk and the production of quasi- periodic oscillations. Drawing on his deep knowledge of kinetic theory, René contributed to the theory of planetary formation in the early solar system, and to the formation of large scale structure in the universe. With François Bouchet, he pioneered the numerical simulation large scale structure in France, thereby establishing a French cosmology program that is currently in the forefront of the next generation of European cosmological space experiments.

The list of Professor Pellat's positions and honors is long and probably unprecedented in France. Professor Pellat was a long- time Corresponding Member of the French Académie des Sciences, and, since 1986, a Directeur de la Recherche de Classe Exceptionnelle – the highest position in the French Centre National de Recherche Scientifique (CNRS). From 1972 to 1982, Professor Pellat was a Maître de Conférence de Physique at l'École Polytechnique. During the 1980s and early 1990s, he served as Conseiller Scientifique (1982-1986), Président du Conseil Scientifique (1984-1986), and Conseiller en Sciences et Technologie (1986-1992) to the Directeur Général du Centre National des Études Spatiales (CNES). In 1989, Professor Pellat was appointed to a three year term as Président du Conseil d'Administration du CNRS, which was followed by his appointment as Président of CNES. In 1998, Professor Pellat became the Haut- Commissaire à l'Énergie Atomique (CEA) with responsibilities for both the civilian and military usage of atomic energy. His CEA position gave René the opportunity to reorganize the ITER project and to arrange the return of the U.S.'s participation. Professor Pellat's contributions to science were recognized in France by the awards of the Officier de la Légion d'Honneur and Chevalier de l'Ordre National du Mérite et de l'Ordre de Gagarine. Professor Pellat also received La Médaille d'Argent du CNRS and Le Grand Prix Joannidès de l'Académie des Sciences.

René's words were often in conflict with his actions. He claimed to pursue science as a game just to have fun. Yet, no one was more passionate about science or more devoted to the search for scientific truth. He always used the power associated with the very high positions which he held in France to advance the progress of science. René was often rough of manner and brutally frank in his critiques. Yet he trained, nurtured, and found positions for a cadre of brilliant French students to whom he remained unfailingly devoted. At UCLA, those who knew and worked with René became members of his extended "family," and came to treasure their relationship with him. He left us much too soon.

Ferdinand V. Coroniti
George Morales