The European Physical Society and its Nuclear Physics Division

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The European Physical Society (EPS) will be described.
Starting from its birth in 1968, the actual objectives, the organization and the governance will be illustrated, as well as the relations and involvements with the National Physical Societies. The prizes, awards and distinctions recognized by the EPS for the excellence and contributions to the community will be shown.

Particular attention will be devoted to the Nuclear Physics Division (NPD), highlighting all aspects of general interest in the field of experimental, theoretical or applied nuclear science.

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A life for radiation medical physics

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Medical Physics was born almost 1500 years ago but it took until 1778 to obtain an official name, when the Société Royale de Medicine in Paris introduced the expression “Physique Medicale”.
On 8th November 1895, the discovery of the X-rays by Wilhelm Roentgen produced the monumental medical revolution in Diagnosis and Therapy: “seeing is believing”. The three disciplines of Radiology, Radiation Therapy and Radiation Medical Physics were established. In this presentation after a brief description of the infantry and development of Medical Physics, I will describe some of my research contributions in this field, especially in Radiation Medical Imaging (PET, X-ray, Hybrid systems) and Particle Therapy. The connection of this type of research with the teaching and the medical profession is necessary. I have long tried at European level that the three words (teaching, profession and research) could go “together”: a few examples will be shown. Finally, my perspective for the future of this fascinating discipline will be presented.

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Next Generation Gamma-ray Imaging

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Gamma-ray imaging has an important role in a wide range of applications, including nuclear medicine, environmental assay and decommissioning/safety of nuclear reactor sites. The design and operational principles of imaging systems differs according to the measurement requirements of the application. The common goal is to locate sources of gamma radiation in 3D space, but typically with performance trade-offs in efficiency, accuracy, and precision. The University of Liverpool Nuclear Physics Group is developing gamma-ray imaging systems based on spectroscopic, segmented semiconductors detectors that are either coupled to a collimator or exploit gamma-ray tracking techniques to produce the images. Systems that employ gamma-ray tracking have excellent solid angle coverage and efficiency, resulting in an increase in the fraction of radiation that is used to generate an image, when compared with collimator systems. The quality of the image produced with tracking relies heavily on accurate measurement of the gamma-ray interaction positions and energies within the detectors.

This presentation will showcase research and development being undertaken at the to translate gamma-ray tracking and imaging techniques primarily developed for nuclear instrumentation used in nuclear structure physics experiments to secondary applications in nuclear decommissioning and healthcare. There will also be the opportunity to hear how industrial and multidisciplinary partnerships have been developed over the past 10 years to co-address specific imaging challenges, including leadership of a national research network in cancer diagnosis.