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Modern Nuclear Physics in the European research Landscape

Physics of atomic nuclei and their constituents undergo transformations and develops towards more and more interdisciplinary field of research. Three articles published in the present issue of Europhysics News on nuclear astrophysics, spectroscopy of anti-hydrogen and search for new physics at low energies perfectly illustrate the new facet of nuclear physics research.

All major European infrastructures in this domain which are currently under construction, upgrade or commissioning as FAIR in Germany, GANIL-SPIRAL2 in France, ISOLDE at CERN, SPES in Italy, ELI-NP in Romania and future ISOL@MYRRHA in Belgium include in their scientific program and design new exciting opportunities in nuclear physics and at the same time in search for physics beyond the standard model of particle physics, astrophysics, atomic physics, nuclear medicine, solid state physics and numerous applications for society.

The recent detection of gravitational waves from a neutron star merger by the LIGO-VIRGO collaboration, followed by the observation of electromagnetic radiation by numerous telescopes, boosted experimental and theoretical physics in many domains, not least nuclear physics, particle physics and astrophysics. In particular, the equation of state of nuclear matter and scenarios of nucleosynthesis have been, and will be further,

confronted with such observations. For nuclear physics, and indeed all physics communities, this extraordinary discovery is imposing a new interdisciplinary approach to research. In this context, several new initiatives reinforcing collaboration between astroparticle, nuclear and particle physics were initiated by ECFA (European Committee for Future Accelerators), NuPECC (Nuclear Physics European Collaboration Committee) and APPEC (AstroParticle Physics European Consortium) are playing the major role in the development of particle, nuclear and astroparticle physics at the European and international level. Organisation of joint seminars, interdisciplinary expressions of interest and joint diversity charter are among the most important actions actively supported by the three committees (see <http://nupecc.org/jenaa/>).

Since 1991, NuPECC, together with the whole community, regularly prepares and publishes a Long-Range Plan (LRP) in nuclear physics. Past editions of the LRP as well as the most recent one published in 2017 have been essential to identify opportunities and priorities for the nuclear science in Europe and provide the ministries, national funding agencies and European Commission with a framework for coordinated advances in the discipline. The next LRP which will be elaborated in a coming few years should fully explore interlinks and mutual fertilisation between nuclear physics and neighbouring fields of research. ■



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