

## A Vietnamese Paper on Nuclear Physics Published in Prestigious Review Letters Journal

On January 10th, a paper entitled “A simultaneous microscopic description of nuclear level densities and radioactive strength functions” by Vietnamese researchers, two of whom work for national research institutes, was published in the Physical Review Letters journal.

They are Associate Professor Nguyen Quang Hung of DTU, Dr. Nguyen Dinh Dang of the RIKEN Nishina Center for Accelerator-Based Science in Japan, and Ms. Le Thi Quynh Huong of Khanh Hoa University in Nha Trang province.

According to Associate Professor Nguyen Quang Hung, nuclear level density and radioactive gamma-ray strength functions have become key research topics in Nuclear Physics, first introduced by Hans Bethe, eighty years ago and by Blatt and Weisskopf sixty-four years ago respectively. These two measurements are indispensable in the understanding of astrophysical nucleosynthesis, including the calculation of reaction rates in the cosmos and the production of elements. They are also used in nuclear energy production and the transmutation of nuclear waste technologies. This area gained further impetus in 2000, when experimentalists at Oslo University proposed a method to simultaneously extract both of them from the primary gamma-decay spectrum, in one single experiment. However, a unified theory to simultaneously and microscopically describe both the NLD and RSF coefficients has not yet been postulated.

*“In this work, we have proposed, for the first time, a unified and consistent microscopic approach capable of describing simultaneously two important quantities, the nuclear level density and radioactive gamma-ray strength functions. The results we gained were quite similar to those produced by the researchers at Oslo University in terms of ytterbium with nucleon superfluid-pairing, total neutrons and protons, which were 170, 171, and 172 respectively”,* said Associate Professor Hung.

This paper was important in Nuclear Physics research in Vietnam because nuclear reaction components, concerning nuclear level densities and radioactive strength functions, can now be determined using the two new accelerators the government has provided for the VNU University of Science, a Tandem Pelletron 5SDH-2, and the 108 Military Central Hospital, an IBA 30MeV Cyclotron.

The Physical Review Letters journal was first published in 1958 by APS, with an impact factor of 7.654. PRL is the world's premier Physics journal. It publishes short, comprehensive, high quality reports of

significant and notable results on fundamental and interdisciplinary Physics research. PRL provides readers with news of the most influential developments and transformative ideas in Physics. This is the second paper published by Vietnamese researchers in the leading Physics journal. The first one was written by a research team led by Professor Doan Nhat Quang, from the Vietnam Physics Institute, published in 2002.

*(Media Center)*