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DERICA PROJECT AND STRATEGIES OF THE DEVELOPMENT OF LOW-ENERGY NUCLEAR PHYSICS

Thursday, 2 September 2021 11:00 (30 minutes)

Development of radioactive ion beam (RIB) facilities is the highway of the low-energy nuclear physics development in the world the last 3 decades. RIB studies in Russian Federation at the moment are conducted only in one place – at the Flerov Laboratory of Nuclear Reactions (FLNR) of the Joint Institute for Nuclear Research (JINR) ACCULINNA/ACCULINNA-2 facility [1,2]. However, scientific opportunities of these instruments are lower than those expected for the modern RIB center.

It is proposed to develop powerful RIB facility DERICA (Dubna Electron –Radioactive Ion Collider facility) covering broad range of modern nuclear physics aspects (new isotope synthesis and production, its masses, lifetimes and decay modes, nuclear reactions and spectroscopy). The emphasis of the project is storage ring physics with ultimate aim of electron-RIB scattering studies in the collider experiments. DERICA concept combines in-flight production of RIBs by projectile fragmentation technique (primary beams up to uranium with energy ~100 AMeV), stopping RIBs by gas catcher, reacceleration by LINAC-synchrotron combination, usage of reaccelerated RIBs for reaction studies and for storage ring experiments. Scientific program of the project is published in the Letter-of-Intent [3].

The recent R&D [4] has demonstrated technical feasibility of the basic facilities of DERICA: (i) heavy-ion cw LINAC-100, assumed to provide world-record scale intensities of primary beams, (ii) the fragment separator DFS, which need to withstand the mentioned very high intensities, (iii) DERICA ring branch and especially the electron-radioactive ion collider facility.

Status of DERICA project and the most recent information can be obtained at [5]. The project has been included in the long-term development strategic plan of JINR [6].

[1] L.V. Grigorenko et al., UFN 186 (2016) 337 [Physics-Uspekhi 59 (2016) 321].

[2] A.S. Fomichev, L.V. Grigorenko, S.A. Krupko, S.V. Stepanov, G. M. Ter-Akopian, The EPJ A 54 (2018) 97.

[3] L.V. Grigorenko et al., Physics-Uspekhi, 62 (2019) 675.

[4] L.V. Grigorenko et al., Physics of Atomic Nuclei 84 (2021) 68–81.

[5] DERICA project site: <http://derica.jinr.ru/>

[6] JINR long-term development strategic plan up to 2030 and beyond
http://www.jinr.ru/wp-content/uploads/JINR_Docs/JINR_Strategy_2030.pdf

Is this abstract from experiment?

No

Name of experiment and experimental site

N/A

Is the speaker for that presentation defined?

Yes

Details

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Internet talk

No

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