

Hi high-sensitivity detector for the neutrino investigations on the electron magnetic spectrometer

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At present, the Udmurt State University together with the Physical-Technical Institute Ural Branch Russian Academy of Science have build and are adjusting the unique 100-cm electron magnetic spectrometer with double focusing by the uniform field 2 that has the resolution of 10^{-4} [1]. For the precise determination of the energy of electrons that are formed during the reaction $\nu_e + d \rightarrow e^- + p + p$ with the use of the electron magnetic spectrometer, an experimental unit for the system of highly susceptible high-speed parallel electron recording based on microchannel plates has been developed. The electrons formed penetrate into an energy-analyzer with the help of a quadrupole lens where they are dispersed by energies in the magnetic field and focused on the spectrometer focal plane. The presence of the focal plane in spectrometers with magnetic focusing gives a unique opportunity of the simultaneous record of electrons having different energies that are focused upon it, which is not possible to carry out on electrostatic spectrometers. For the signal increase, a herringbone assembly with three microchannel plates is used; each plate has multiplication factor of 10^6 and a resistive position-sensitive sensor. This type of a detector is several orders more efficient than an ordinary channel electron multiplier.

1. V.A. Trapeznikov. Electron spectroscopy of small radiation doses//UFN, 1998, №7, c.793-799.