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Prototype of detector of reactor antineutrinos for reactor monitoring

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In recent years, much attention has been focused on neutrino research because it can shed new light on greatest mysteries in physics. A new experiment devoted do detection and investigation of reactor antineutrinos is being performed at the IEAP CTU Prague and JINR Dubna using highly segmented scintillating detector S^3. This paper describes present status of polystyrene based setup (detector part, front-end electronics, data acquisition system) which does not contain any dangerous or flammable materials and is absolutely safe to be place in the close vicinity from the reactor. Close vicinity from the reactor core enables study of neutrino properties with higher efficiency, for example investigation of short-range neutrino oscillations and verification of sterile neutrino hypothesis because of its short oscillation length. if it is possible to measure the antineutrino energy spectrum, the operational status, thermal power of the reactor and isotopic composition of the reactor fuel can be also determined. As a result, it will be possible to prevent illegal production and extraction of ^{239}Pu, which is an essential part of nuclear weapons. Therefore, this research has applications in physics beyond the Standard Model as well as find practical applications in reactor physics.

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