Contribution ID: **192** Type: **Poster**

Ultra-cold neutron detector for the spectrometer of the neutron lifetime measurement

The gas-filled detector of ultra cold neutrons (UCN) has been constructed for the spectrometer of the neutron lifetime measurements (PF2/MAM, ILL, France). It is intended for UCN flux monitoring in measurement cycles.
The detector consists of six proportional counters which are grouped into two independent counting channels and placed in the single gas volume. The entrance window (Ø 290 mm) has been made of aluminum foil with a thickness of 100 μm to ensure minimum UCN losses. The force acting on the foil at working conditions is about 660 kg. Therefore, the special stainless steel grid has been placed in front of the foil to support it from the neutron guide side (vacuum).
The gas mixture is selected to minimize the "wall effect" and to achieve UCN efficiency $\varepsilon \geq 80\%$. The final composition of the gas mixture has been optimized during detector tests under the real experiment conditions (background and UCN spectrum) at ILL reactor. The selected working gas mixture is 13 mBar 3He + 20 mBar CO2 + 1060 mBar Ar.
The detector has been successfully tested and it is currently being used at the UCN spectrometer at ILL.

Primary author: Dr ILYIN, Dmitriy (Petersburg Nuclear Physics Institute (PNPI), St. Petersburg State University)

Co-authors: Dr KRIVSHICH, Anatoli (Petersburg Nuclear Physics Institute (PNPI)); Dr SEREBROV, Anatoly (Petersburg Nuclear Physics Institute (PNPI)); Mr VASILIEV, Anatoly (Petersburg Nuclear Physics Institute (PNPI)); Mr IVANOV, Evgeniy (Petersburg Nuclear Physics Institute (PNPI)); Mr ANDREEV, Vladimir (Petersburg Nuclear Physics Institute (PNPI))

Presenter: Dr ILYIN, Dmitriy (Petersburg Nuclear Physics Institute (PNPI), St. Petersburg State University)

Track Classification: Miscellaneous