



Contribution ID : 65

Type : Poster

## Search for EC/EC-capture of $^{58}\text{Ni}$ on excited states of $^{58}\text{Fe}$ .

Thursday, 1 December 2022 13:00 (15)

Double electron-capture (EC/EC) of  $^{58}\text{Ni}$  on excited states of  $^{58}\text{Fe}$  is investigated at Baksan neutrino observatory INR RAS in DULB-4900 laboratory (4900 m w. e.) using the ultralow-background HPGe detector with a sensitive volume of  $200\text{ cm}^3$  ( $\sim 1\text{ kg}$  mass) and a natural nickel sample of  $\sim 68\%$   $^{58}\text{Ni}$  with a mass of  $\sim 6\text{ kg}$ . The detector is surrounded by low-background shield consist of 180 mm oxygen-free copper, 150 mm lead, 1 mm cadmium and 80 mm polyethylene. After preliminarily analysis of the experimental data accumulated over 3200 hours, the experimental limits are obtained for the  $2\nu\text{EC/EC}$  decay of  $^{58}\text{Ni}$  to the  $2_1^+$ , 811 keV and  $2_2^+$ , 1675 keV excited states of  $^{58}\text{Fe}$ . The limits are  $T_{1/2}(\text{EC/EC}, 0 \rightarrow 2_1^+) > 4 \cdot 10^{21}\text{ yr}$ , and  $T_{1/2}(\text{EC/EC}, 0 \rightarrow 2_2^+) > 7 \cdot 10^{21}\text{ yr}$ . At the same time, the sensitivity of the experimental setup for one year of measurements to the processes mentioned above is:  $S(\text{EC/EC}, 0 \rightarrow 2_1^+) = 2 \cdot 10^{22}\text{ yr}$ , and  $S(\text{EC/EC}, 0 \rightarrow 2_2^+) = 1.3 \cdot 10^{22}\text{ yr}$ . All limits are at 90% CL.

**Primary author(s)** : Dr. KAZALOV, Vladimir (INR RAS); Dr. KUZMINOV, Valery (INR RAS); Dr. GANGAP-SHEV, Albert (BNO INR RAS); GAVRILYUK, Yurii (BNO INR RAS); YAKIMENKO, Sergei (BNO INR RAS)

**Presenter(s)** : Dr. KAZALOV, Vladimir (INR RAS)

**Session Classification** : Poster Session

**Track Classification** : Nuclear physics