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PAPER TITLE **Recombination Index of Radiation Quality of High Energy Neutron Beams.**

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MAJOR SCIENTIFIC TOPIC NUMBER 3 ..... (see page 7)

ABSTRACT (See instructions overleaf)

Neutrons have been considered created in beryllium, copper and lead targets bombarded by 660 MeV protons from phasotron of Joint Institute for Nuclear Research, Dubna. Mean neutron energies in the beams formed at zero degree respectively to the direction of proton beams equal approximately to 350 MeV, 280 MeV and 200 MeV, respectively. Recombination index (RIQ) has been taken as a parameter describing the radiation quality.

Measurements performed using a 3,8 cm^3 recombination chamber filled with TE gas up to 500 kPa. Two voltage values : U_R =30v and U_S =800v applied to the chamber electrodes sequentially. The recombination index of radiation quality (Q_R) derived from measured currents of the recombination chamber using the following relation :

$Q_R = (1/R) [1-i(U_R)/i(U_S)]$ where i - are the ionisation currents of irradiated recombination chamber related to the monitor reading; U_S - is the voltage applied to the chamber ensuring nearly saturation conditions; U_R - is the recombination voltage chosen during the calibration in a reference gamma field, such that : $i(U_R)/ i(U_S) = 1 - R = 0.96$

All result agree within experimental and calculation uncertainties (10%) The RIQ values practically do not differ also with values of quality factor defined in ICRP -21

It is shown only minor difference of RIQ for three beams considered.

RIQ decreases with depth in the phantom water 5 at 1cm depth to approximately 3.2 at the depth of 12 cm, where a broad maximum of depth dose distribution taken place. The radial distribution of RIQ are similar for three beams too.

It can be concluded that there is no essential differences radiation quality of the beam. The beam with energy of 350 MeV is preferable, because of higher beam intensity.