BETA-STABILITY OF SUPERHEAVY NUCLEI

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As it follows from analyses of experiment [1,2], in the region limited by magic numbers the energy of isobaric transition changes as linear function of distance from β-stability line Z^* [1]. So for heavy nuclei ($Z > 82$, $N > 126$) the energy of beta decay (in MeV) is [2]

$$Q_{\beta\pm}(A, Z) = \pm 1.13\,(Z - Z^*) + D, \qquad (1)$$

D is the parity correction: $D = 0.75$ for odd(Z)-even(N) nuclei and $D = 2.1$ for even(Z)-even(N) nuclei. Then

$$Z^*(A) = 0.36A + 9.1. \qquad (2)$$

Note, that due to relation $Q_{\beta+}(A, Z) = -Q_{\beta-}(A, Z-1)$ and $Q_{\beta-}(A, Z) = -Q_{\beta+}(A, Z+1)$ it is suffice to consider only nuclei of Z even. The confrontation of results of calculation (according to equation (1) and (2)) with experiment is presented in the Fig .1. As it is seen, a sufficiently high accuracy is assured, the rms deviation is about 0.2 MeV (and maximal deviation 0.5 MeV) at inclusion of all experimental data of the Table of Isotopes [3].

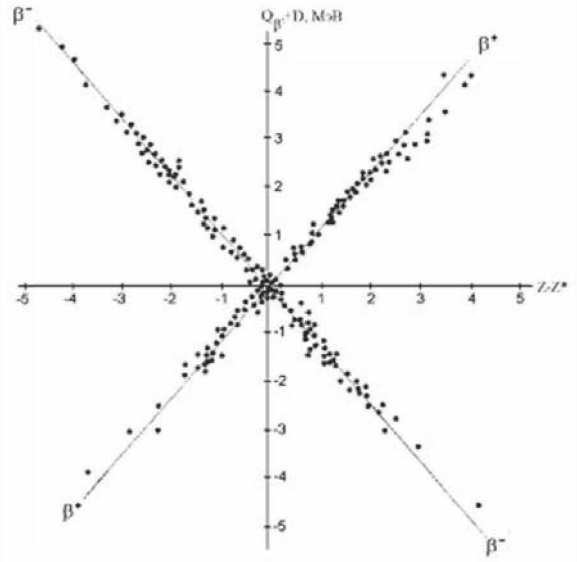

Fig.1. Dependence of Q_β on difference $Z - Z^*$.

1. N.N.Kolesnikov // Izvestia AN SSSR. 1985. V.49. P.2144.
2. N.N.Kolesnikov // Preprint №8/2008. Physical Faculty. MSU.
3. R.B.Firestone *et al.* // Table of Isotopes 8-th. ed. New York, 1996.