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Modification of Magic Number through Mass Formula with Shell Correction SHINYA ITO, YUMA KIKUCHI, AKIRA OHNISHI, KIYOSHI KATO, Hokkaido University — We study how single particle energies depend on the asymmetry of protons and neutrons. In most of former researches, single particle energies are not considered to be dependent on the asymmetry. In our research, the energy of each orbit is assumed to be a function of the asymmerty, (N-Z)/A. This assumption is based on the experimental fact that new magic numbers appear in neutron-rich nuclei[1]. We introduce this effect in a similar way to the shell correction by Myers and Swiatecki[2], and apply the correction to the Weizsäcker-Bethe mass formula. Energy levels are obtained by fitting to the nuclear masses at the ground state. Analyzing the obtained functions of single particle energies, we confirm the appearance of the new magic numbers which have been already indicated by the experiment, and find additional magic numbers at higher energy states.

References
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