

Zeitschrift: Helvetica Physica Acta
Band: 23 (1950)
Heft: [3]: Supplementum 3. Internationaler Kongress über Kernphysik und Quantenelektrodynamik

Artikel: Binding energies and the energy surfaces in the region of the heavy natural radioactive isotopes
Autor: Wapstra, A.H.
DOI: <https://doi.org/10.5169/seals-422273>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 21.02.2026

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

Binding energies and the energy surfaces in the Region of the heavy Natural radioactive isotopes

by **A. H. Wapstra**, Amsterdam.

The binding energies of these isotopes can be computed relative to the last members of their families by means of combinations of α and β decay energies. By the following method of interpolation we computed them relative to ^{206}Pb , the last member of the U-family. As is well-known the binding energies of the isotopes are lying on three surfaces in the n, A, E spaces; one for N and Z even, one for both odd, and one for N or Z even ($n =$ neutron excess, $A =$ mass number, $N =$ number of neutrons, $Z =$ number of protons). Sections of these surfaces with planes N, Z or A constant will nearly be parabolas in the region of maximum binding energies for isobars. We can therefore adjust the-family to the U-family by claiming, that the binding energies of the $e - e$ isotopes from these families with the same N or Z must fit to one parabola as accurately as possible. Then the $e - e$ and the $o - o$ surface are known respective to the binding energy of ^{206}Pb .

In order to adjust the odd mass families to the U-family we assume, that the $e - o$ surface lies in the mean halfway between the $e - e$ and the $o - o$ surface. The distance between the last two surfaces is found for some values of A by claiming, that the binding energies of isobars with even mass must lie on two parallel parabolas. The distance seems to increase from 1,8 MeV to 2,0 MeV for $A = 210$ to $A = 218$, and then to decrease to 1,2 MeV for $A = 235$.

In order to study the distance between the $e - o$ and the $e - e$ surface we consider an isotope with a value N or Z used in adjusting the Th- to the U-family. For this isotope we compute the height on the estimated parabolic section with the $e - e$ surface used. The difference with the binding energy of the isotope relative to the last member of its family will be a fair estimate of the distance between the $e - e$ and the $e - o$ surface, increased by the difference in binding energy of ^{206}Pb with ^{207}Pb or ^{209}Bi . The distances obtained in this way follow a course with A analogous to the distance between the $e - e$ and the $o - o$ surface, so it is possible to choose the differences in binding energy mentioned in such a way, that the $e - o$ surface is lying fairly well halfway the $e - e$ and the $e - o$ surface.

The result of our computations will be published in *Physica*.