

The 2012 Atomic Mass Evaluation and the Mass Tables

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From the famous formula $E = mc^2$, the nuclear masses yield their binding energies, i.e. the result of all interacting forces within the nucleus.

The Atomic Mass Tables are the fruit of the evaluation of all valid experimental data aiming at mass measurements, or in which relevant energy measurements are given.

Among the various projects that originated in the 1950s, the concept developed by Aaldert H. Wapstra, proved to be able to face the otherwise insolvable difficulties due to the strong interconnections among the measurements. This concept is the one that is referred to as the Atomic Mass Evaluation (AME). It was the only one which survived and produced a series of Mass Tables over the years, the most recent of those, in 1983, 1993, and 2003 (AME2003) [1], this last one already nine years ago.

A new Atomic Mass Table was eagerly awaited. It has just been released [2]. This new publication includes all experimental material that was available to us until the end of 2012: reaction and decay energy measurements, and inertial mass (spectrometers) measurements; accepted and rejected experimental data, as well as outweighed ones

At the conference we will present the new policies and procedures used and also some of the most important features of our knowledge of the nuclear properties stemming from the experimental surface of masses as it appears nowadays: shell quenching at several magic numbers, new shells for the super-heavies, the doubly-magic ^{270}Hs , recessing drip-lines,...

Among the co-authors of the AME2012 tables is the name of Aaldert H. Wapstra, the founder of the AME, who passed away at the end of 2006. He made essential contributions to the AME2012 during the two years following the publication of AME2003. And more than those two years, this work is filled with his work (back to the 1950's) and with his spirit.

[1] Files of AME2003: <http://amdc.in2p3.fr/masstable/Ame2003/file1.html>.

[2] Files of AME2012: <http://amdc.in2p3.fr/masstable/Ame2012/file1.html>.

[3] Bulletins of the Amdc: <http://amdc.in2p3.fr/bulletins/file1.html>.