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Evaluations of Nuclear and Decay Properties

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The ensemble of experimental data on the 2800 nuclides which have been observed to date are being evaluated, according to their nature, by different methods and by different groups. Decay properties and nuclear levels are evaluated by the NSDD (Nuclear Structure and Decay Data) network yielding the ENSDF, while the ground-state masses are studied in the (so-called "horizontal") Atomic Mass Evaluation (AME) to produce the "Mass Tables". In these tables (n,γ) reactions play a key-rôle since they provide many of the most accurate mass differences, helping thus in building the "backbone" of masses along the valley of β-stability. At the interface of these two works, the NUBASE "horizontal" evaluation has the delicate task to assign ground states and excited isomers in several difficult cases. Other evaluations devoted to radii, moments, etc are beyond the scope of this talk.

The NSDD works are published regularly, more generally by mass-chains but sometimes for single nuclides, in the Nucler Data Sheets journal. Electronically, they are distributed as ENSDF files.

The most recently published mass table is of December 1995 (Nucl. Phys. **A595**). It was an update of the 1993 one with, besides many important new mass measurements, an already improved treatment of the isomers. The isomer matter is a continuous subject of worry in the AME, since a mistreatment can have important consequences on the ground-state masses. A special effort was thus devoted to these isomers by the NUBASE collaboration, leading to a complete revision and evaluation of those ground-state and isomeric properties that could allow to identify which states are involved in a mass measurement. The NUBASE evaluation was published for the first time in September 1997 (Nucl. Phys. **A624**).

In the future it is planned to have the AME and the NUBASE evaluations, which have the same "horizontal" structure and basic interconnections at the level of isomers, to be published together, the first time in a year from now. The number of new results that were published since AME'95 and NUBASE'97 is impressive. Among them it worth mentioning the very accurate determination of the mass of the neutron; the proton decays in the region of medium-A proton-rich nuclides and the new data on isomeric situations in alpha decay; the masses measured by the ISOLTRAP and the MISTRAL experiments at CERN, by the GSI-ESR experiment at Darmstadt, and SPEG at GANIL; and the Penning-Trap measurements of Stockholm. Some new features of the next NUBASE publication will also be discussed.