

FP7 – Letter of Intent for a Nuclear-Data Evaluation Network

1. Goals of the project

The success of radioactive beam facilities (and associated experiments) has led to a notable increase in quantity (and quality) of data concerning exotic nuclides. There is a definite need for increased and coherent effort in the evaluation of nuclear data: from the “traditional” main-chain evaluations of nuclear structure to the ground-state properties of exotic nuclides as well as applications that require the construction of nuclear data networks such as in nuclear energy, transmutation of nuclear waste as well as stellar nucleosynthesis. This project aims at forming a partnership to strengthen evaluation activities on these different but related fronts. Potential partners include the following groups:

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|-------------|------------------------|--------------------------|----------------------------------|
| Bulgaria: | U. of Sofia | D. Balabanski | nuclear structure; k-isomers |
| Romania: | NIPNE-Bucharest | V. Zamfir | nuclear structure |
| U. Kingdom: | U. of Surrey | P. Regan, P. Walker | k-isomers; nuclear structure |
| France: | CSNSM-Orsay | G. Audi, D. Lunney | atomic masses |
| Belgium: | ULB-Brussels | S. Goriely | reaction networks (astrophysics) |
| Germany: | GSI-Darmstadt | Yu. Litvinov | atomic masses; charge-radii |
| Belgium: | U. of Leuven | G. Neyens | charge-radii; nuclear moments |
| France: | CEA-Bruyeres-le-Chatel | S. Hilaire, J.-M. Daugas | reaction networks (transmut.) |

An interesting possibility is to include partners with activities specializing in the production of radioactive nuclides since this information is crucial for planning future experiments and quite difficult to obtain. The following additional partners could be involved:

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|--------------|---------------------------|--------------|
| Spain: | U. Santiago de Compostela | J. Benlliure |
| Switzerland: | CERN-Geneva | T. Stora |

As evaluation activities are coordinated worldwide by the IAEA, it would be natural (and desirable) to associate them with this network. Other potential associates could include: NRG-Petten (Netherlands), IRMM-Geel (Belgium), PNPI-St. Petersburg, (Russia).

2. Details of the different components

This part of the project aims at providing two types of (electronic) data-bases to the European and the international nuclear structure community: evaluated data on different observables and mass-chain evaluations within ENSDF.

Within the first initiative the following evaluated data bases are under consideration: $B(E2)$ reduced transition probabilities (Bucharest, Sofia), 1qp rotational bands in odd-mass nuclei (Sofia in collaboration with NNDC evaluators), 2qp rotational bands in doubly-odd nuclei; high- K multi-quasiparticle ($\geq 3qp$) rotational bands (Sofia, Surrey (?) in collaboration with NNDC evaluators). Nuclear ground-state properties also need a critical evaluation in order to be compiled. The NUBASE evaluation is a nice example and includes the spin, half-life, dominant decay mode, mass, and associated isomeric states for each known nuclide. The mass is a particular example, resulting from the Atomic Mass Evaluation, performed for the last 40 years (most recently in Orsay), but is now in peril due to retirement of its evaluators. NUBASE would be extended within this network to include radii (by GSI) and nuclear moments (by GSI and Leuven).