DFT-UNEDF Workshop on Determination of the Nuclear Energy Functional

The DFT-UNEDF Workshop on the Optimization of the Nuclear Energy Functional is rapidly approaching. The meeting will be held at the Joint Institute for Heavy Ion Research at Oak Ridge National Laboratory on Tuesday, January 22, 2008. We shall begin on Tuesday at 9:00am and end with a Conference dinner at 7:00pm. The DFT-UNEDF Workshop will be followed by the JUSTIPEN/LACM meeting on January 23-25, 2008.

The aim of the meeting is to prepare the development of the next generation of functionals by discussing various aspects pertaining to the optimization of the EDF. In particular, we would like to address two burning questions:
a) What experimental data should be taken into account for the EDF optimization? That is, what should be the minimum set of observables used in the fit, and what parts of the functional will they probe?
b) What optimization techniques should be used?

We find it useful to think about question a) in terms of a matrix M(X,Y) with X being experimental observables, and Y being properties of the functional. At this stage, we do not wish to discuss any specific form of the functional, but rather focus on its physical content. For that reason, Y should be defined rather broadly. Namely, it includes: volume properties, surface properties, density-dependent terms, spin-orbit and tensor properties, effective mass, time-odd fields, pairing, etc. in both isoscalar and isovector channels. The X data can be masses, radii, surface thickness, nuclear moments, low-lying collective modes, giant resonances, high-spin states, etc. During the first part of the Workshop, we will discuss what observables (X) would constrain functional properties (Y) best, and what is the minimal data set we should be considering. That is, we will construct “the matrix.”

The second goal of the meeting is to define the optimal fitting strategy. This includes the choice of weights with which the particular observables enter the chi-square function and the choice of the optimization algorithms employed in the multi-dimensional minimization.

The meeting is meant to be very informal with two introductory talks by expert practitioners, followed by an open discussion forum containing short contributions illuminating particular points, and the summary. In order to make the roundtable as effective as possible, we would like to ask each participant interested in making a point to prepare a two-slide presentation. The first slide should contain the main point and a concrete proposal. The second slide can have examples (plots, tables) and references. We would appreciate if you could adopt this format in order to facilitate discussions. You are welcome to make as many contributions as you wish within the scope of the meeting agenda.

Please send us the titles of your contributions and the slides (in pdf or ppt format) by January 15. We intend to issue a summary of the Workshop’s findings in a short UNEDF report that will provide guidance for future DFT developments.

Practical Details:
- If you haven't done so yet, please send the necessary information to Sherry Lamb lambsm@ornl.gov in order to have your badge processed.
- Do not forget to make local hotel and transportation arrangements.
- Tell us your arrival time.
- Tell us if you intend to attend the Workshop dinner on Tuesday evening.

The organizers