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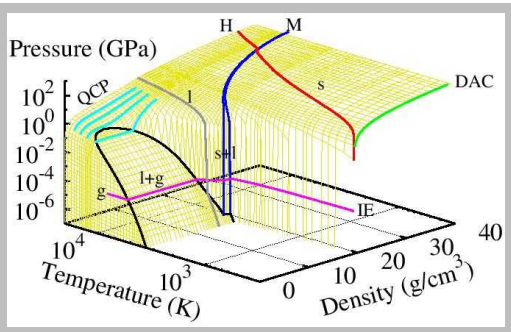

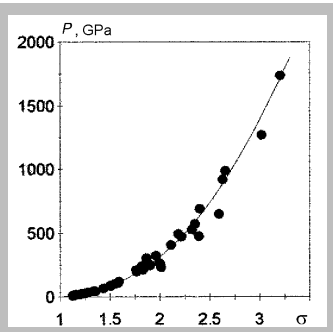

ISWdb Requirements Workshop

Background & Goals

John B. Aidun

U.S. Coordinator of ISWdb project

The ISWdb Idea.

- International Shockwave Database idea:
  - IPCP-JIHT Database –
    - Data collection and selection was begun by L. Al'tshuler and A. Bushman from 1975 to 1981.
    - Bushman continued this work until 1993.
    - Bushman joined by Lomonosov in 1984.
    - Lomonosov and K. Khishchenko continued data selection from 1993 to 1997.
    - In 1997 Lomonosov, Khishchenko, P. Levashov, and I. Lomov produced the first version of the database as an internet-enabled utility at http://www.ficp.ac.ru/rusbank
  - Ralph Menikoff & Yuki Horie wrote an EOS database proposal in 2002
    - Discussed at SCCM03 in Portland.
  - Lomonosov began discussing idea of ISWdb with Aidun by 2007
    - Discussed at SCCM07 in Hawaii.
  - First funding for JIHT work on ISWdb began in 2011.

Menikoff-Horie 2002 database proposal

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1. Database available through the web and available to all researchers.
2. As an electronic database, can continually add new data and correct errors.
3. Database should include:
   - experimental data;
   - EOS models with fitting parameters for specific materials;
   - Synthetic data from numerical “experiments" such as molecular dynamics or Monte Carlo simulations.
4. Researchers should contribute data, as well as use it.

Menikoff-Horie 2002 proposal - Benefits

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- Having material data readily accessible encourages comparison between different experimental data sets, and between models and experiments.
- Results of a simulation are no better than the data that goes into them. EOS model parameters are key input data.
- By referring to a specific material in a database, the model along with parameters would be fully specified without the need to duplicate the description of model in every paper.
- Validation of models is an important issue for doing good science.
  - It would be a great advantage to divide up this time-consuming work by having the careful work of one researcher available to others
  - A common database would facilitate and encourage such cooperation.

ISWdb Goals.

- International Shockwave Database:
  - Developing a database on thermodynamic and mechanical properties of materials under conditions of shock wave and other dynamic loadings
    - selected related quantities of interest
    - the meta-data that describes the provenance of the experimental measurements and material models;
  - Make available internationally on the internet, in an interactive form.

Workshop Goals.

- Workshop:
  - defining the scope of desired information and functionality of the database;
  - evaluating procedures for reviewing and vetting additions to the database;
  - brainstorming approaches for data collection and engaging the international research community to use and contribute to the database;
  - identifying candidate members of a steering committee that will help guide the development and operation of the database.

ISWdb Challenges.

- Technical
  - How to gather data from published articles?
    - Copyright issues?
  - How to set up a mirror site in U.S.A?
  - Expanding visualization capabilities.
  - Optimize the GUI for ease of use.
- Social
  - Will need to iterate with community getting input/feedback and modifying the database
- Programmatic
  - How to manage and maintain the database over the long term?

ISWdb – a few desired features.

- Technical
  - A range of data types – useful for wide-range EOS development
    - DFT cold curves
    - DAC hydrostats
    - Isobaric explansion
    - CTE
    - DFT-MD for critical point data
  - Include raw data, as well as density normalized data
  - Include capability to scale to a chosen density
  - Include reported uncertainties
  - Include metadata
  - Report how data was captured
    - Typed in from a table; scanned; digitized.
  - Make numerical manipulations transparent to user
  - Make analyses downloadable
    - Permit users to conduct analyses off-line.

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- Social
  - Do we need a more inclusive name?
    - ISHPdb, perhaps?
  - Need a capability for users to leave comments and provide feedback
    - A wiki page or Trac site, perhaps?