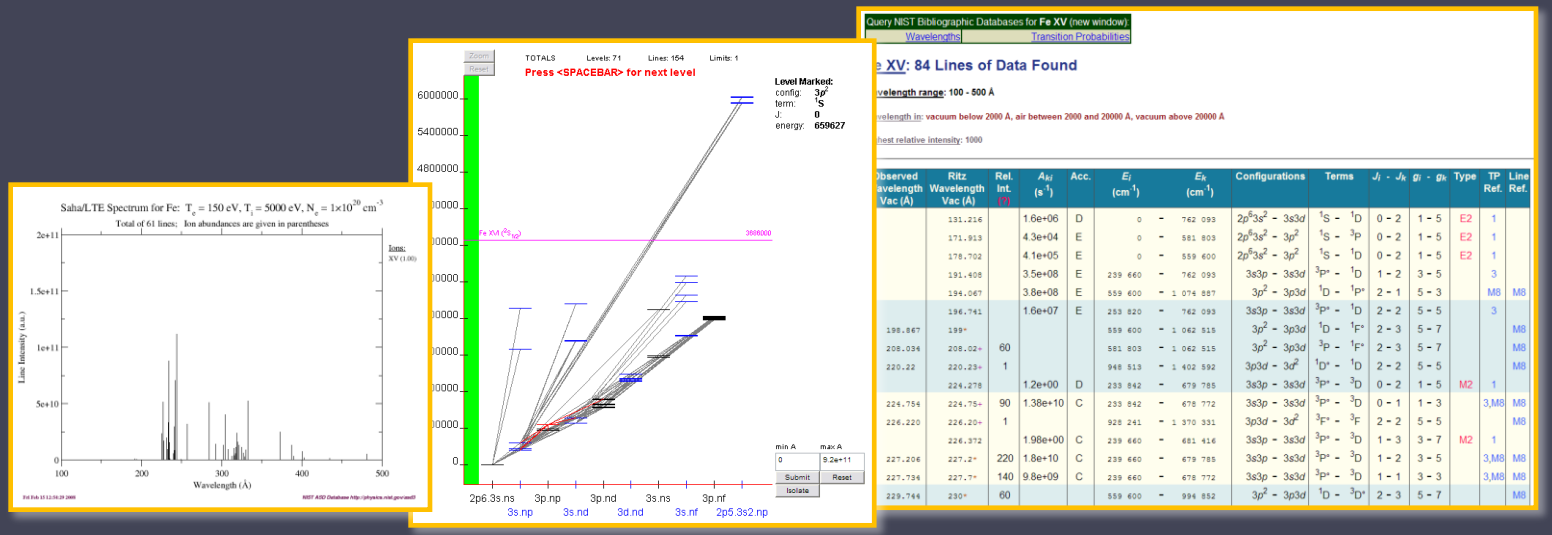


Atomic Data Management at NIST

Yuri Ralchenko

National Institute of Standards and Technology

US Department of Commerce

Wolfram DATA SUMMIT 2010
September 9-10, Washington, DC

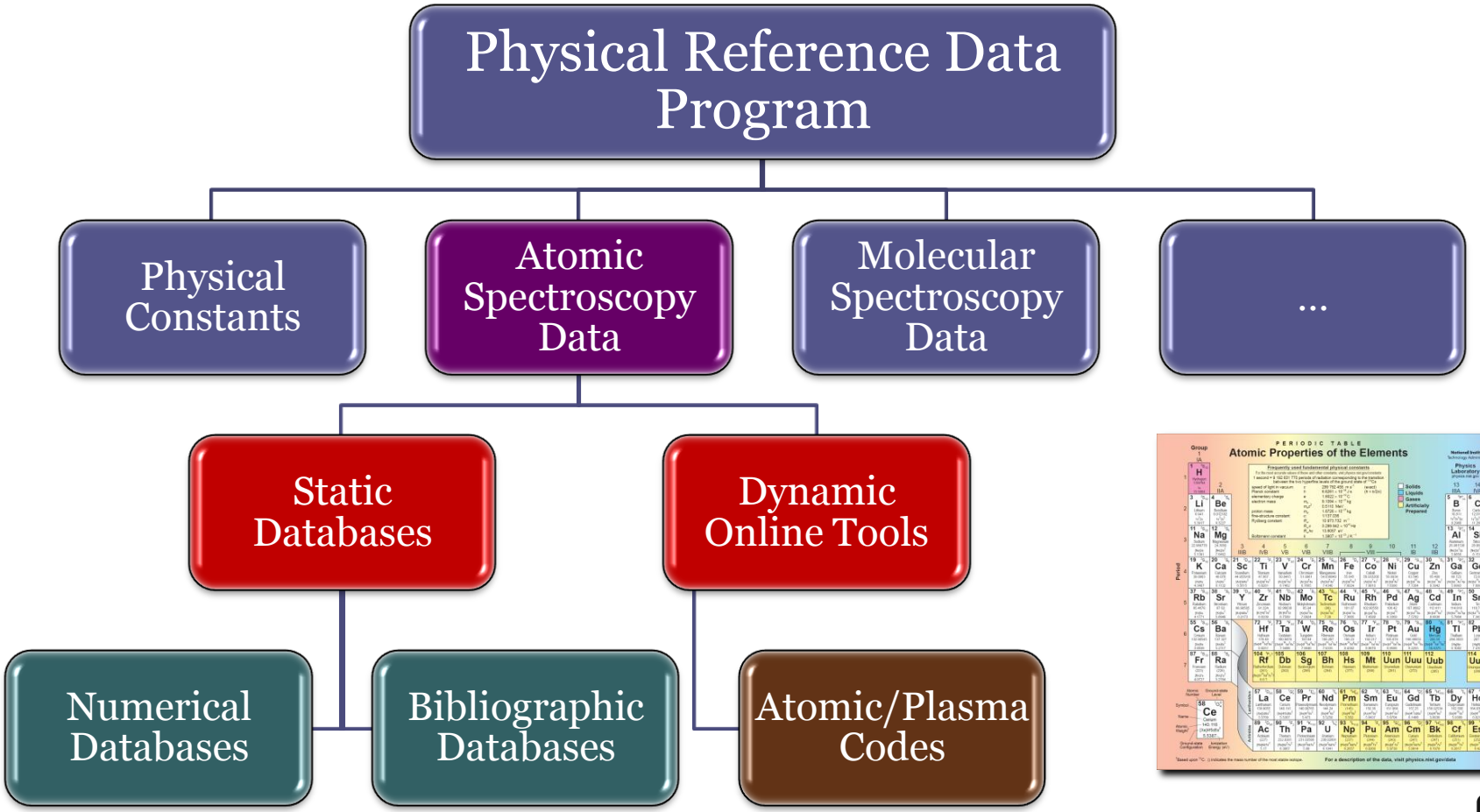
NIST National Institute of Standards and Technology
U.S. Department of Commerce

NIST's Mission

- *to promote U.S. innovation and industrial competitiveness by advancing **measurement science, standards, and technology** in ways that enhance economic security and improve our quality of life*
  - *…*
  - *to measure, calculate, **critically compile**, and **disseminate reference data on atomic structure** and fundamental constants in support of basic research, commercial development, and national priorities*
  - *…*

Atomic Data Organization

http://www.nist.gov/physlab/data/index.cfm



Atomic Databases/Tools

Numerical

- Premier source of atomic data in the world
- Recommended and critically evaluated atomic data
- Advanced search, data integrity, graphics, *bibliography*

Bibliographic

- Updated almost daily!
- Contain added value (keywords)
- Invaluable up-to-date access to existing data

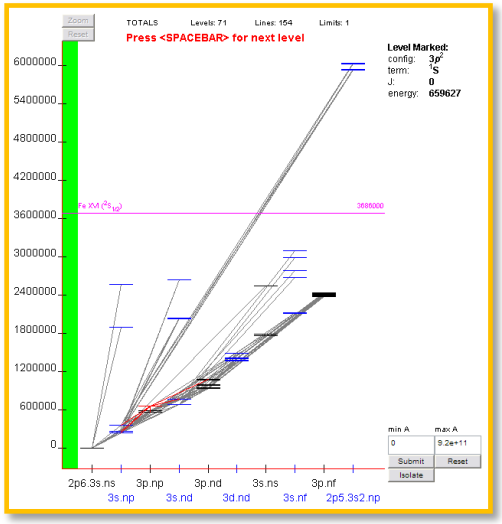
Online codes

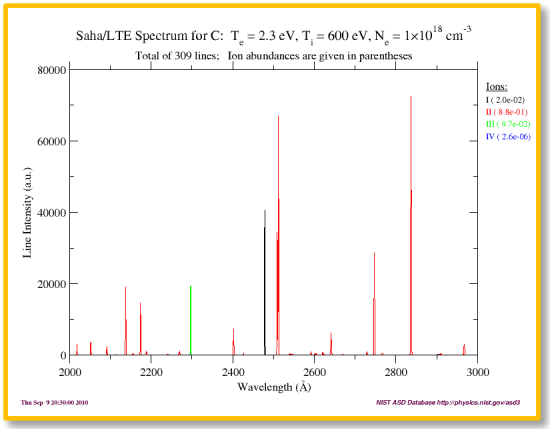
- No data? No problem... but beware!
- Extensive help system
- Fast, reliable, fed by feedback

RDBMS

Examples

http://www.nist.gov/physlab/data/index.cfm





Atomic Spectra Database

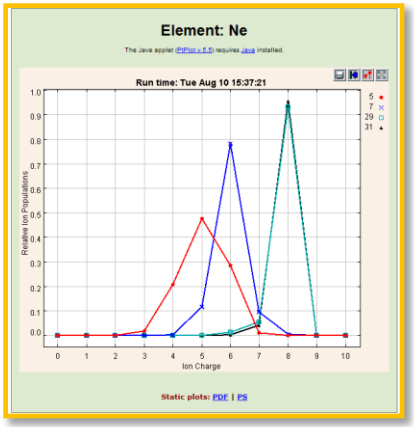
- **250,000** lines and levels
- **1500** queries/day, 2/3 of PL
- Version **4**
- Since **1995**

Atomic Lines/Levels Bibliographic Database

- **15,300** references
- Coverage: **1802**--today

FLYCHK code

- **~350** users
- Various plasma emission parameters



Key issues in atomic data(base) development

- **Data quality**
  - Often overlooked in favor of data volume
  - **Recommended/evaluated data** is of highest importance
  - Data compilation is a major effort
- **Derived data**
- Data volume is not exceedingly large
  - DBMS reliability is important
- **Data exchange**
  - Well-designed standards are needed
  - GENIE engine at IAEA
  - XML Schema: XSAMS
  - International involvement is important
- **Online simulations**
  - Cloud computing?
  - Distributed approach to scientific computing

From collection of (atomic) data to collection of (atomic) data-generating software?..

NIST National Institute of Standards and Technology U.S. Department of Commerce