ENHANCEMENT OF DATABASE NORAD-ATOMIC-DATA FOR
ATOMIC PROCESSES IN PLASMA

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NORAD data and Atomic processes

- ONLINE DATABASE: NORAD-Atomic-Data - 5 types of data

Methods: ALS (experiment), R-matrix (theory)

- The x-ray Kα transition of elements for various astronomical, biomedical, fusion plasma application
- NORAD-Atomic-Data can be accessed from databases, ex: CTA-Harvard, International Atomic Energy Agency

THEORETICAL CALCULATIONS: R-matrix CODES

Large-Scale Atomic Calculations (Ohio Supercomputer Center)

Table: Partially supported by Ohio Supercomputer Center

APPLICATIONS

ASTROPHYSICAL APPLICATION

- Core-Re r-process in proto-planetary nebulae (Bergmann 2016, Woosley & Weaver 1995). Good agreement between NLTE analysis of Cr II and Ca II lines (top) is obtained by using photoionization cross sections at NORAD (bottom).

ENGINEERING APPLICATION

- Study of burnout and reduced properties of electrical discharge machining (EDM) plasma for temperatures up to 10,000 K and pressure range 0–3 MPa, with different amounts of intrinsic and extrinsic NORAD, Adachi et al (2002) (bottom) in not evident maintained (NME) with iron and chromium with iron strongly adsorbs the plasma.

NORAD Data Tables

- Atomic Data Table 1: Each row gives files for various atomic processes of the ion on the left

Table: Sample set of fine structure energy levels of Fe XIV, grouped as components of LS terms.

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- Transition levels are identified in energy table.

Conclusion

- NORAD-Atomic-Data was recorded in 2007. Most source: Astrophysics, Physics, Eng, Chem, Atmospheric, etc.
- The amount of accuracy is expected to considerably
- Following studies shows the status of currently usage April 2020. Total Bases = 100,000+ for more details please visit:

Tables are given in energy order for each symmetry & in LS multiplet form

Theory is explained in the book: