A=215: Practical Work-plan

Nov 26-29, 2012: ENSDD workshop at VECC, Kolkata

- Why A=215?

- **Practical reasons**:

    -Current data in ENSDF ~12 years old: May 1, 2001.

    -Short mass chain i.e. not a huge amount of total data.

    -Mixture of different types of decays and reactions.

    -Although, there are perhaps only 12 or so new papers for A=215, still each mass chain in ENSDF needs to be updated after ~10 years.

    -Update of new Q values from 2011/2012-AME from previous 2003 values

    -Update of internal conversion coefficients using BrIcc code, replacing previous values from Hager-Seltzer (HSICC) coefficients.

A=215: Work-plan

- **Nuclear Physics**:

  - Experimentally known Nuclides of A=215 (Z=80-91, N=135-124) are semi-magic or few particles away from Z=82, N=126 doubly-magic Pb-208 nuclide.

  - Single- or multi-particle structures are expected

  - Significant number of isomers have been identified.

  - Comparisons with shell-model calculations are possible

- **Nuclear astrophysics:** Relevance to r-process in nucleosynthesis

- **Environmental**: At-215 (0.1 ms) alpha decay, and daughters Bi-211 (2.1 min) and Tl-207 (4.8 min) ; Po-215 (1.9 ms) alpha decay, and daughters Pb-211 (36 min) and Bi-211 present in environment from U-235 decay and its grand daughter Rn-219 (3.9 s) (present everywhere in air and water samples)

A=215: Work-plan

- **Experimentally known nuclides of A=215**

  Hg-215: Z=80, N=135: only isotope ID; no $T_{1/2}$

  Tl-215: Z=81, N=134: only Isotope ID; no $T_{1/2}$

  Pb-215: Z=82, N=133: isotope ID and $T_{1/2}$

  Bi-215: Z=83, N=132: α, β-, IT decays

  Po-215: Z=84, N=131: α, β- decays

  At-215: Z=85, N=130: α decay

  Rn-215: Z=86, N=129: α decay; in-beam γ-ray

  Fr-215: Z=87, N=128: α decay; in-beam γ-ray

  Ra-215: Z=88, N=127: α decay; in-beam γ-ray

  Ac-215: Z=89, N=126: α decay; in-beam γ-ray

  Th-211: Z=90, N=125: α decay; in-beam γ-ray

  Pa-211: Z=91, N=124: isotope ID, $T_{1/2}$

  α-decay parents: A=219 nuclides. α-decay daughters: A=211 nuclides

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Nuclide assignment:

1. **Jagdish Tuli:** **Po-215**

    1. Sudeb Bhattacharya (SINP)*
    2. Shinjinee Dasgupta (VECC)*
    3. Rupayan Bhattacharya (Calcutta Univ.)
    4. Sayantan Sarkar (APC College, Kolkata)
    5. Betylda Jyrwa (NEHU)
    6. Sylvia Badwar (NEHU)
    7. Reetuparna Ghosh (NEHU)

2. **Daniel Abriola:** **Bi-215**

    1. K. Vijay Sai (SSIHL)*
    2. R. Gowrishankar (SSIHL)*
    3. V. Ramasubramanian (VIT)
    4. C. Anu Radha (VIT)
    5. Mrutunjaya Bhuyan (IOP)
    6. Sadhna Mukerji (BARC)
    7. S. Bhattacharyya (VECC)

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Nuclide assignment:

3. Ashok Jain, Sukhjeet Singh: Ac-215, Fr-215

1. Ranjita Mondal (IIT-K)
2. Bhoomika Maheshwari (IIT-R)
3. Navneet Kaur (PU)
4. Devendra P. Singh (AMU)
5. Parnika Das (VECC)
6. Pardeep Singh (GNDU)
7. S. Lakshmi (IIT-R)

4. Balraj Singh, Suresh Kumar: Ra-215

1. Aman Rohila   (DU)*
2. Naveen Bhardwaj (DU)
3. Chandan Kr. Gupta (DU)
4. Rojeeta Devi (DU)
5. G. Pandikumar (IGCAR)
6. Paresh Prajapati (IPR)
7. Shisir Purohit (IPR)

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Nuclide assignment:

5. Swapan Basu, Gopal Mukherjee: At-215, Rn-215

1.Tumpa Bhattacharjee (VECC)*

2. Debashis Mandal (VECC)

3. Sabyasachi Paul (BARC)

4. Arindam Sikdar (VECC)

5. Priyanka Debnath (Jadavpur Univ.)

6. Srijit Bhattacharya (Govt. Coll, Barasat)*

7. Alok De (Raniganj Girls' College)

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- All work will not get completed by Nov 29. Lot will be required in the next few weeks.

- Expected completion of first draft by the end of Jan 2013

- Send data files to Balraj Singh and Gopal Mukherjee, co-ordinators for this evaluation.

- Final file by the end of Feb 2013, send for review to Eddie Browne at LBNL.

- Possible joint publication in NDS by May 2013 under the authorship of instructors, and those participants who contribute effectively to the evaluation effort.

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- ## Reference material on webpage:

  2001, 1992, 1977, 1966 published NDS evaluations of A=215

  A=215, 219 in Table of isotopes-1978

  A=215, 219 isotopes: DDEP evaluations.

  2011AuZZ: AME interim mass adjustment files

  2011StZZ: compilation of static magnetic dipole and electric
  quadrupole moments

  2004An04: evaluated nuclear radii.

  Requires familiarity with retrievals of information from ENSDF,
  XUNDL, NSR, NUDAT databases; and use of computer codes
  such as FMTCHK, GTOL, BrIcc, LOGFT, ALPHAD, PANDORA,
  ENSDAT, etc.   Hope it makes sense!