# Introduction and AARM Progress on the Universal Materials Database

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# History - Why a Universal Materials Database?

- There is a wealth of knowledge about the radiopurity of various materials used in the development and construction of experiments that require low backgrounds.
- Currently, this information is shared through publications, electronic databases or informally.
- There exists an inefficiency.
  - Repeated measurements, acquiring knowledge - costs time and $.
- LRT 2010 Conference at SNOLAB included a discussion of the need for a system to effectively share this information.
- This motived AARM to pursue the development of a Universal Materials Database.

# Vision

- Idea is to have a central reference tool for the low background community to organize and share data - think PDG.
  - Other examples:  indico, various wikis, CERN document server
    - This tool should be downloadable and easy to use.
- Well designed data format and a high quality interface.
- Capability to be run privately or publicly with easy movement between the two.
- Flexibility - Not all materials or users would have the same requirements.
  - Example:  copper vs LXe

# Solution:

- A system consisting of a database with an integrated web interface.
  - CouchDB is the chosen database to be the backbone of the system.
    - Data will be stored in JSON (JavaScript Object Notation) documents.
      - Flexible format that will have core fields, but will be extendable for additional information with no need to modify the standard.
- We will use a tool to index and provide a search engine for the database (more on this in James' talk).
  - One example of such a tool is Lucene.

# Community Buy In

December 2012 teleconferences included people from LBNL, SNOLAB, SCDMS, EDELWEISS and EURECA. (Note: we were trying to keep the call to a small core group of people.)

- Jodi Cooley
- Adam Cox
- Prisca Cushman
- Klaus Eitel
- Richard Ford
- Jules Gascon
- Josef Jochum
- Vitaly Kudryavtsev
- Jean Lanfranchi
- James Loach
- Pia Loaiza
- Alan Poon
- Franz Proebst
- Anthony Villano

# Progress and Plans

- SNOLAB has agreed to provide support in the form of computing, manpower or both.
- The structure of the database exists and has been used by the Majorana collaboration (more from James Loach).
  - Needs expanded functionality.
- We need to finalize the standard data format.
  - Which fields will be mandatory
  - Whether there will be optional fields
  - Document and circulate the results.

# Progress and Plans

- Need to make some decisions on how the package will be developed.
  - Should we use a cloud service like Cloudant for development and then move to SNOLAB for hosting once developed?
  - Will mirrors of the database in Europe or Asia increase the access speed? Are there other reasons we should have mirrors?
    - If so, who will host those? (Asia --> China)

# Plans and Progress

- Adam Cox (EDELWEISS) has written some preliminary python code to move the ILAS database into the Universal Materials Database.
  - Needs to be updated and modified for the final data format.
- James Loach will visit SMU in September to give a seminar and work on the database.
- James will move to China at the end of 2012 to join the faculty at Shanghai Jiaotong University as an Associate Professor. He will have resources to devote the project.

# Plans and Progress

- SMU student(s) will assist with populating database with existing data.
  - Need a system to check and verify data submitted.
- Hope to have first working version of database up and running as demonstration for LRT 2013 (April 10 - 12, 2013).