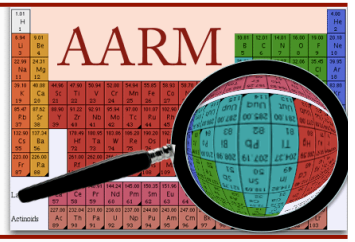
PI: Priscilla Cushman
Co-PI: Dong Ming Mei, Kara Keeter,
Richard Schnee?, Reyco Henning ?

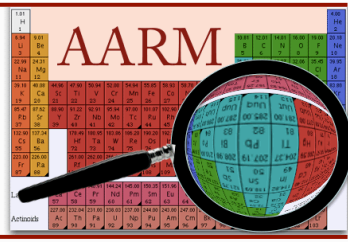


Scientific Collaborators and/or Level 2 Managers

Jodi Cooley-Sekula (1.3, 2.1)
Tina Keller (3.4)
Andreas Piepke (1.3.1)
Robert McTaggart (3.2)
John Wilkerson (1.3)
Andrew Sonnenshein (1.3.2)
Esther Mintzer (1.6, 1.7)
Eric Hoppe (1.6, 1.7)
Richard Schnee (1.3, 1.3.2)
Reyco Henning (1.5.1, 3.5, 2.1, 1.3.1)
Henning Back
Tim Classen
Yuri Efremenko (1.5.2)
Craig Aalseth (1.6, 1.7)

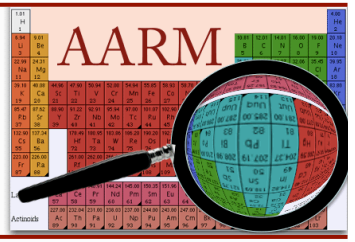
Q: Do we need solar neutrino representation?

WBS Structure



1. Design FAARM
   - 1.1 Water-Shielded Room (Cushman + CNA)
     - 1.1.1 Structural design (Dufrene..?)
     - 1.1.2 Physics reach and active elements (Martoff)
   - 1.2 Ultra-sensitive ImmersionTank Design
     - 1.2.1 Structural design (CNA?
     - 1.2.2 Physics reach and active elements (Keeter)
   - 1.3 Design throughput, sensitivity, type, and number of Screeners (Schnee)
     - 1.3.1 Gamma Counting (incl. NAA screening) (Mei, Piepke)
     - 1.3.2 Beta Counting (Schnee)
     - 1.3.3 Alpha counting (Cooley, Sonnenshein)
     - 1.3.4 New Technologies
   - 1.4 R&D Prioritization and funding disbursement (see next page)
   - 1.5 Materials acquisition and storage
     - 1.5.1 Solid (inc. Cu stockpiling, lead, common shielding material) (Henning)
     - 1.5.2 Liquid (storage of cryogens, water, liquification plant) (Efremenko)
   - 1.6 Materials purification and assay (Hoppe)
     - 1.6.1 Cu Electroforming (Mintzer)
     - 1.6.2 ICPMS and other chemically assisted processes (Mintzer)
     - 1.6.3 Cryogen purification (Keeter)
   - 1.7 Utilities and auxiliary needs (wet chem, sample prep, clean shop) (Hoppe)

R&D Initiatives



R&D related to ultra-sensitive immersion tank
(scintillator, purification, how much do we have to do? – place saver?

2nd generation beta cage (or other beta?)

Work with XIA

radon mitigation systems – new system, or just ventilation?

HE neutron benchmarking and MC work (in concert with SD)

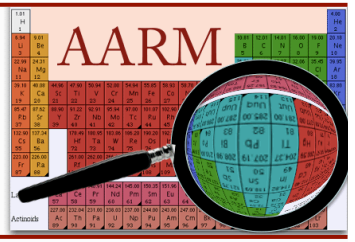
New cross section measurements

ICPMS, (or is this already covered by Majorana?)

New technologies?

New Fields

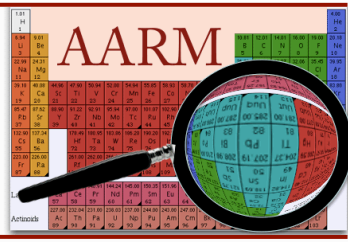
WBS Structure



2. Characterize backgrounds (Mei)
   2.1 Radon monitoring and Design of Radon Mitigation (Cooley, Henning)
   2.2 Cosmogenic Backgrounds (Cushman)
   2.3 Gamma, (α,n) and fission backgrounds (Cushman)
   2.4 Characterization of Shielding

3. AARM Integration and Collaboration Building (Cushman)
   3.1 IT website management (IT administrator)
   3.2 Integration with other fields (Bio, Geo, etc) (Robert McTaggart, Tullis Onstott, Tom Kieft… this may be a Synergies Collaboration)
   3.3 Collaboration with ILIAS – new FP7 in 2010? (Cushman)
   3.4 E&O (Keller)
   3.5 Nuclear database and Counted Materials (Mei)
   3.6 Screening, training, staffing (Integrate with Sanford efforts)(Cushman, Henning)

Year 1 tasks



WBS 1: Design "Facility for AARM" (FAARM)

- Determine AARM-related needs of ISE
- Identify limited R&D required
- Participate and plan SUSEL screening program
  EPSCoR, MRI, Donations from existing sites
- Start Training program between SD and Kimballton/Soudan

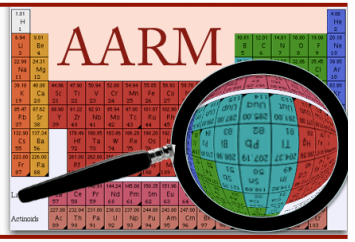
WBS 2: Characterize the DUSEL environment

- Compile all exisiting and historical data
- Cavern U/Th/K (chemical and γ spectroscopy), Rn survey
- Cross-calibrate with ILIAS (Jan Kiesel - standard survey)

WBS 3: Create AARM integrative group with website

- Integrate with other S4 groups (DUSEL integration workshop)
- Identify new user base (Synergies workshop -*shared with cross-cutting S4 and E&O)*

Year 1 budget



Design “Facility for AARM” (FAARM)
including management of the integration teams

Administrator (shared with Lar S4 or NOVA) (1/4 time) $25k

skill set: Microsoft project, financial, conference organization, web-savy

Engineer CNA (water shielded room) $100k

Engineering subcontract to water tank $40k

Travel to meetings (disbursed to participants) 20 @ $800 x (4+1 mtgs) = $80k

Software engineering support $10k

DUSEL integration workshops $80k – shared resources? (quarterly?)

Synergies workshop $25k

4 half-postdocs in R&D areas (which ones?) $200k

Characterize the DUSEL environment ~50 k

Travel to site (10 trips of 1 week each) $15k

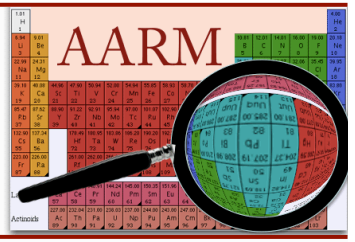
1 mo. Summer salary (SD person?) – not from S4?

Summer travel for others $10k ?

2 undergrads, 2 grads to help (E&0, collaborate with EPSCoR) – not from S4?

Host Jan Keisel & staff (ILIAS) $30k

Year 2 tasks



Design FAARM

Design and implementation plan for Water-shielded room and footprint of immersion tank

Auxiliary services (clean shop, purification plant, sample prep, wet chem lab, electroforming

First pass cost and schedule

R&D on target opportunities (priority on Immersion tank R&D)

Training (Schedule courses at SUSEL, invite participants, E&O)

Start SUSEL screening (part of staged DUSEL design), appoint staff

Characterize the DUSEL environment

Finish initial surveys

Design/Implement longterm muon/high energy neutron monitoring

Design and cost overall Radon mitigation plan

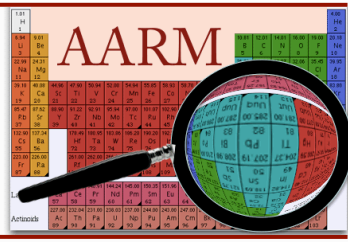
Expand website functionality

Create user interface for screening *(incl. existing sites, ILIAS)*

Create Materials Database and Software repository

Consolidate new user base (2nd Synergies workshop)

Year 2 budget



Design FAARM

same as year 1, but perhaps more R&D?

Characterize the DUSEL environment

Engineering (Rn survey, mitigation) $30k

Muon and HE neutron system $30k

Summer travel for others $10k

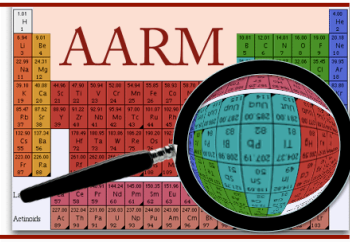
2 undergrads, 2 grads to help (E&0, collaborate with EPSCoR)

Expand website functionality

Software support $10k

2nd Synergies workshop $25k

Year 3 tasks



Complete FAARM design

Finalize Immersion tank design and integrate elements with design of DUSEL facility

Screening & Cu Electroforming proceeding at SUSEL

Training Seminars at SUSEL

Maintain and Expand Integrative Website

Screening schedules integrated between SUSEL and other sites

Include design plans from new user base (3nd Synergies workshop)