

# Summary of Data Management Principles

## LUX Experiment

**Experiment description:** The Large Underground Xenon (LUX) experiment searches for direct dark matter signals using a liquid xenon target and dual-phase time projection chamber. LUX is located at the Sanford Underground Research Facility (SURF) in Lead, SD, USA. The LUX experiment is currently acquiring data and will continue data-taking until mid-2016.

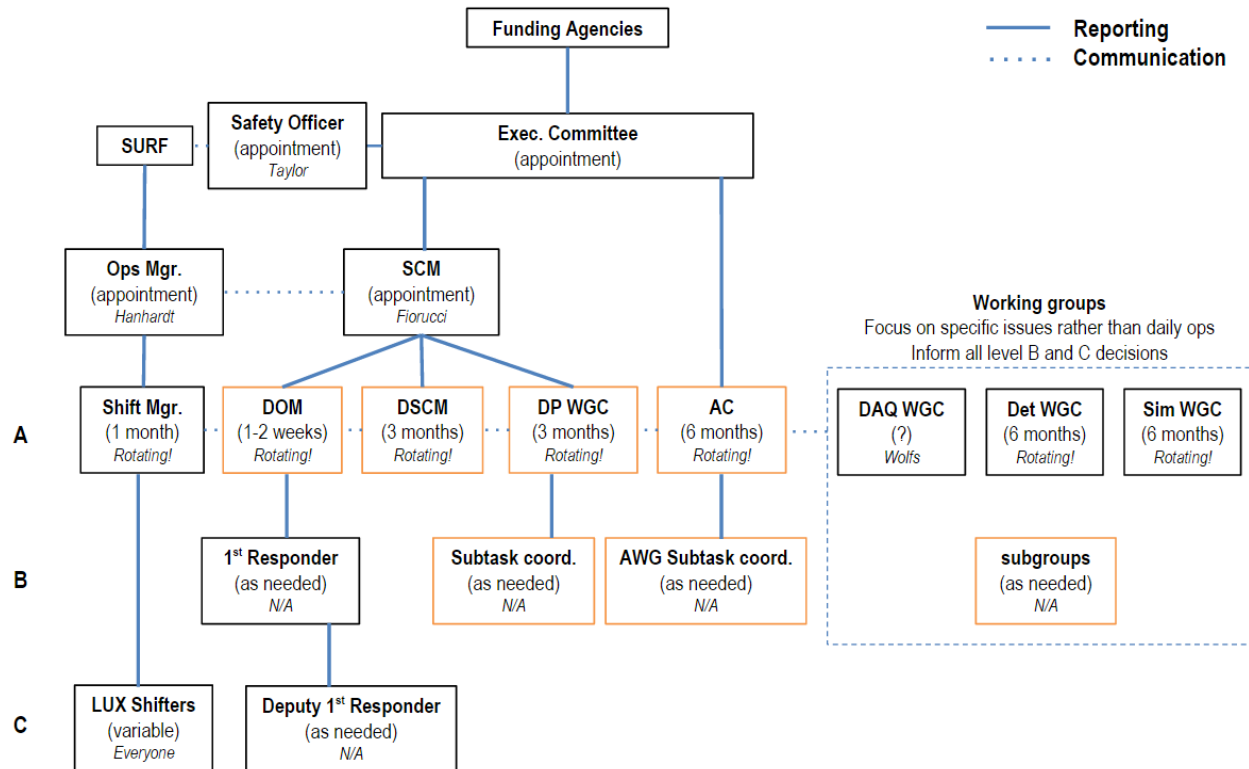
**DOE's roles in the experiment:** The DOE supports university groups, Lawrence Berkeley National Laboratory (LBNL) and the SLAC National Accelerator Laboratory (SLAC) to take part in LUX operations and data analysis. DOE funds operations of LUX through LBNL.

**Partnerships:** The DOE and NSF jointly support the LUX experiment and collaborating institutions. The UK and Portugal are partners in LUX.

**Organization – Agency/Lab level:** The DOE provides operations support, including aspects of computing hardware, to LBNL, which distributes support as required to the LUX collaborating institutions.

**Organization – Experiment level:** The organization chart for LUX is given in the section below. Operations funding oversight is provided by a manager from LBNL. Collaboration management is described briefly in the next section.

**Collaboration:** At present, the LUX collaboration is composed of 19 member institutions, including 3 from the UK and one from Portugal. It includes a total of 121 people, including professors & senior scientists (35), engineers (7), postdocs (19) graduate students (46) and undergraduates (14). There are two elected co-Spokespersons, each serving two-year terms, offset from one another by 1 year. The co-Spokespersons are elected by the Collaboration Committee, which consists of all members of the Collaboration. An Executive Committee is formed from the senior researchers of the collaboration. If a vote is required, each institution has one vote. An Executive Committee Chair is elected by the Executive Committee. There are additional rotating, appointed positions of responsibility, for example leading science coordination and analysis.



**Data Policy Management:** The collaboration, through its Executive Committee, is responsible for setting the data distribution and access policy. Such policy can be revised through a process of review and approval via majority vote by the Executive Committee, with input from members of the collaboration and in particular members of the Data Processing working group and Data Analysis working group. The policy is then posted in a single webpage accessible to all collaboration members on the central Twiki website.

**Data Description & Processing:** The type of data produced in LUX includes raw data from testing, calibration, and measurements at participating institutions and at SURF and digital and graphical results from analysis of raw data and Monte Carlo simulations. The corresponding metadata includes design documentations, detector operating parameters, calibration data, analysis tools, student theses, and materials for education outreach activities. The raw and reduced data sets are stored in the following two locations: (1) at Brown University and (2) at the National Energy Research Scientific Computing (NERSC) center at Lawrence Berkeley National Laboratory (LBNL). Detector operating parameters are stored on the database at SURF and mirrored at Brown University.

**Data Products and Releases:** Implementation of the policy for raw and reduced data is the responsibility of the Data Processing working group coordinator, which is a rotating 3-month appointment. Implementation of the policy for analysis results in the form of internal notes is the responsibility of the Analysis working group coordinator, which is a rotating 6-month appointment. Implementation of the policy for science publication is the responsibility of the Executive Committee. The LUX collaboration does not make raw and reduced data publicly accessible.

**Plan for Serving Data to the Collaboration and Community:** To effectively and promptly share our research results, the LUX collaboration will continue to take the following steps. The LUX collaboration is committed to continue to provide access to the LUX scientific results.

(1) We will use our LUX TWiki website to document all major research activities, project status, computing and storage resources. The information will be backed up daily; the entire website will be synchronized every 30 minutes with mirrors that are installed on the surface and underground at SURF, ensuring continuous access to LUX documentation.

(2) Document newly developed instrumentation, simulation, and analysis tools (including user instructions) on time so that other researchers may use them.

(3) Collaboration members, including junior researchers and students, will be given the opportunity to join professional workshops and conferences to present the LUX research work and results.

Funding support does not exist and is not planned to provide software tools for community access to LUX data.

**Plan for Archiving Data:** Data will be archived at Brown University and NERSC through at least 2019. NERSC's HPSS (High Performance Storage System) will keep the data available through at least 2019 and a similar system will be used at Brown. Archival storage beyond 2019 depends on usage.

**Plan for Making Data Used in Publications Available:** After the publication of significant science and engineering results, these results will be made available to the scientific community and public at no cost. Publications will be posted on a publicly accessible website.

**Responsiveness to SC Statement on Digital Data Management:** It is the intent of the LZ collaboration to comply with the Statement on Digital Data Management (<http://science.energy.gov/funding-opportunities/digital-data-management/>) within the constraints of limited funding and resources.