SNO Database Management and Upgrade

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The LBNL/SNO group has taken over the Salt- and NCD(neutral-current detector)-Phase database management task for the Sudbury Neutrino Observatory since mid-2002. This task includes master database update, slave node propagation, database content and validity range verification, network-transmission improvement, as well as user-tool developments etc.

The current SNO database (SNODB) employs a duplex Master-Slave node architecture. Only independently verified information is included in the master database. Any new update to the master content is propagated to all other slave nodes via network with minimal delay (typically within hours). On the other hand, researchers in individual SNO institutions are free to vary their local database contents (slave nodes) to best fit their data analysis needs. These local changes will not be propagated to the master node however until it has been verifying by other institutions as well as by the SNODB Czar.

SNODB is based on the CERNLIB/HEPDB package for historical reasons. Significant customization had occurred over the years and lots of locally developed module/tools had been added. By the end of the Salt-Phase running, the database has grown to about 35GB, with mostly compressed information. The main interface to the database is via the SNO monte-carlo and data processing code, SNOMAN. Intrinsic HEPDB tools are also useful for maintaining the integrity of the stored contents.

SNODB contains both static and temporal information for all the SNO data-taking runs. The stored constants and time varying parameters are vital to all monte-carlo and data processing tasks. In addition, results of official data cleaning, encoded into 4 tag words for each detected event, are permanently stored in the database, significantly improving the efficiency for data analysis. Figure 1 shows an example of using data cleaning tag information from the database to examine the radial dependence of rejected events from SNO data on a run-by-run basis. This gives researchers a quick global view of the dataset in question prior performing more detailed analyses.

There will be significant updates to SNODB once SNO enters its NCD phase to measure the solar neutrino neutral current interaction rate with non-Cerenkov detection of neutrons. The local SNO group will continue to maintain the database for the collaboration.

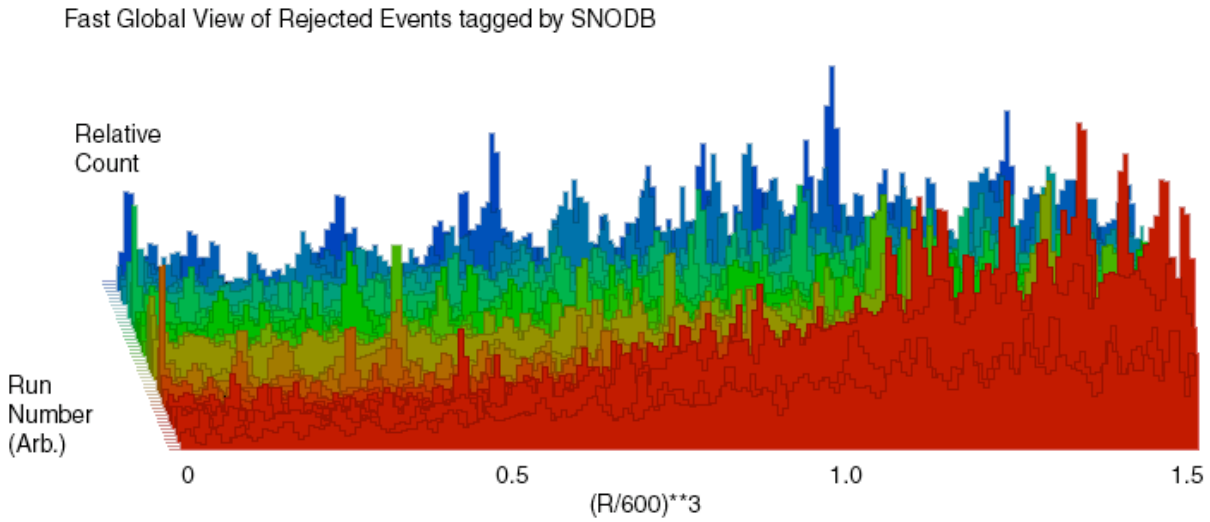

Fig.1 Events that are rejected by instrumentational cuts can be easily identified with the tag-words stored in SNODB. R is the distance (in cm) between the reconstructed vertex and detector center. The radius of the acrylic vessel is 600cm.