ST380 project proposal: Simulated Neutron Count Rates of Plutonium using MCNPX
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The diversion of nuclear material is of great concern to the International Atomic Energy Agency (IAEA) and all nations pursuing the peaceful use of nuclear energy. In order to address diversion concerns related to spent fuel, the IAEA employs measurement campaigns and inspections to quantify and confirm Plutonium presence; the Dual Slab Verification Detector (DSVD) has been developed to assist the IAEA in quantifying Pu content in spent fuel being stored in casks at the BN-350 reactor in Aktau, Kazakhstan.

The DSVD is a $^3$He-based detector designed and built by Los Alamos National Laboratory for use by the International Atomic Energy Agency to quantify the Pu content of the spent nuclear assemblies in dry storage from the decommissioned BN-350 Fast Breeder Reactor in Kazakhstan. The DSVD uses 2 rows of 10 $^3$He tubes to measure neutron emissions from the Dual-Use casks (DUCs), in order to “fingerprint” each DUC. The fingerprint will create a verifiable history based on the Pu content of each DUC that the IAEA can use to confirm that no diversion has occurred at the Significant Quantity (SQ) level. Uncertainties in canister positions within the DUC and background from other nearby DUCs will cause the neutron count from the monitored DUC to deviate from the baseline and must be factored in during the measurement process. MCNPX will be used to simulate these uncertainties and provide a range of error in baseline neutron counts.

Data Source: Already sent (DSVD_1)
Abstract Help

- **Motivation:**
  *Why do we care* about the problem and the results? If the problem isn't obviously "interesting" it might be better to put motivation first; but if your work is incremental progress on a problem that is widely recognized as important, then it is probably better to put the problem statement first to indicate which piece of the larger problem you are breaking off to work on. This section should include the importance of your work, the difficulty of the area, and the impact it might have if successful.

- **Problem statement:**
  What *problem* are you trying to solve? What is the *scope* of your work (a generalized approach, or for a specific situation)? Be careful not to use too much jargon. In some cases it is appropriate to put the problem statement before the motivation, but usually this only works if most readers already understand why the problem is important.

- **Approach:**
  *How did you go about solving* or making progress on the problem? Did you use simulation, analytic models, prototype construction, or analysis of field data for an actual product? What was the *extent* of your work (did you look at one application program or a hundred programs in twenty different programming languages?) What important *variables* did you control, ignore, or measure?

- **Results:**
  *What's the answer?* Specifically, most good computer architecture papers conclude that something is so many percent faster, cheaper, smaller, or otherwise better than something else. Put the result there, in numbers. Avoid vague, hand-waving results such as "very", "small", or "significant." If you must be vague, you are only given license to do so when you can talk about orders-of-magnitude improvement. There is a tension here in that you should not provide numbers that can be easily misinterpreted, but on the other hand you don't have room for all the caveats.

- **Conclusions:**
  *What are the implications* of your answer? Is it going to change the world (unlikely), be a significant "win", be a nice hack, or simply serve as a road sign indicating that this path is a waste of time (all of the previous results are useful). Are your results *general*, potentially generalizable, or specific to a particular case?
How to write an informative abstract:

- Plan to write an abstract that is no more than 10% of the length of the essay.
- In the first draft, note key facts, statistics, etc. that you need to include.
- Do not include a statement of scope; a sentence like "this paper will look at...." is inappropriate in an informative abstract.
- Be sure to omit or condense lengthy examples, tables, and other supporting detail.
- Revise the draft into smooth, stand-alone prose; the abstract itself should be a mini-essay.
- Edit the revision. Be sure that the abstract is complete and accurate. Double check that the abstract is written in the same voice as is the paper.