

## **Snowmass2021 Letter of Interest: Classification standard for underground research space**

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**Thematic Areas:** *Underground Facilities*  
*IF9: Cross-cutting*  
*CF1. Dark Matter: Particle-like*  
*NF10: Neutrino Detectors*  
*RF3: Fundamental Physics in Small Experiments*

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Underground space needs for research are complex. Matching the needs of a new experiment or R&D program to existing spaces currently requires prolonged iteration and expertise. Similarly, potential development of new underground space raises questions about what features may or may not be needed in the future. A classification standard would allow new users (from inside and outside HEP) to quickly identify suitable space and would give developers of new spaces a clear picture of the potential user “market”.

While ultimate, deep underground, ultra low background sites will likely remain a niche need of certain HEP experiments, shallower and maybe not as clean sites enable the R&D for such experiments, new experiments with less stringent needs, and are of interest to a growing number of applications outside HEP. One could even envision commercial development of underground space for lease (possibly a good SBIR topic), once there are suitable standards accompanied by a demonstrated need.

A simple scheme could be to have a number of categories with a rating for each. For example, categories could be: overburden, radioactivity, access, safety requirements, etc. and the resulting code for a given facility would look something like B2S1... Since a large number of categories would result in an unwieldy code, probably a smarter scheme is needed, where each facility can have a simple label, like “Class A3” or something like that. But, while simple to write down, the classes should tie to detailed quantitative criteria for all relevant categories. The purpose of this white paper is to develop such a classification scheme. Interested co-authors are welcome.