

## Investigating cosmic-ray signatures in paleodetectors with PRIMuS: scientific cases and experimental efforts

*Wednesday, April 15, 2026 10:45 AM (30 minutes)*

The PRIMuS experiment is an experimental effort to validate natural minerals as solid-state detectors for paleo-cosmic ray fluxes. This talk presents recent simulative efforts and the experimental status of the project. I will first highlight the results from our latest published paper, in which we simulate the cosmic-ray-induced track count in olivine xenoliths from the Chaîne des Puys, France. Volcanic annealing reset their track records, providing a pristine chronosequence to measure secondary muon and neutron fluxes over the last ~50,000 years. Additionally, I will discuss ongoing simulations of quartz from the Cradle of Humankind, where paleodetector data may provide essential context and aid for the dating of hominid fossils. While the olivine study is finalized from a modeling perspective, both the olivine and quartz targets are now transitioning to the experimental phase. I will outline the PRIMuS laboratory pipeline, including plasma etching and automated optical microscopy readout with micron precision, and track detection and measurement via the OptimusPrimus ML model. I will also discuss how to simulate the distortion coming from the chosen experimental technique to better compare observations to expectations from theory.

### Do you plan to give the talk in person?

Yes

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