Abstract Submitted
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Atom Trap Trace Analysis for radiokrypton and radioargon dating[1] WILLIAM WILLIAMS, WEI JIANG, Physics Div, Argonne National Lab, YUN SUN, Hefei National Lab, Univ of Sci & Tech of China, KEVIN BAILEY, Physics Div, Argonne National Lab, ANDREW DAVIS, Univ of Chicago, SHUIMING HU, Hefei National Lab, Univ of Sci & Tech of China, ZHENGTIAN LU, Physics Div, Argonne National Lab, Univ of Chicago, PETER MUELLER, THOMAS O'CONNOR, Physics Div, Argonne National Lab, ROLAND PURTSCHERT, Univ of Bern, NEIL STURCHIO, Univ of Chicago — Atom Trap Trace Analysis (ATTA), a MOT-based atom counting method, is used to analyze three noble gas radioisotopes (^{81}Kr, ^{85}Kr, ^{39}Ar) covering a wide range of geological ages and applications in the earth sciences. Their isotopic abundances are extremely low, in the range of 10^{-16} – 10^{-11}. Yet, ATTA can trap and unmistakably detect these rare isotopes one atom at a time. The system is currently limited by the excitation efficiency of the RF discharge that produces the metastable atoms (Kr* & Ar*) needed for laser trapping. To further improve the MOT loading rate, we plan to replace the RF discharge with a photon excitation scheme that employs a VUV light source at 124 nm. The VUV source can be a lamp or a free electron laser.

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