

Abstract Submitted  
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**100-fold improvement on Atom Trap Trace Analysis for radiokrypton dating**<sup>1</sup> W. JIANG, Argonne National Lab (ANL), W. WILLIAMS, ANL, Y.R. SUN, HFNL, Univ of Sci & Tech of China (USTC), K. BAILEY, ANL, A.M. DAVIS, EFI, Univ of Chicago; Univ of Chicago (U of C), S.-M. HU, HFNL, USTC, Z.-T. LU, ANL; EFI, Univ of Chicago; U of C, P. MUELLER, T.P. O'CONNOR, ANL, R. PURTSCHERT, Univ of Bern, N.C. STURCHIO, Univ of Illinois at Chicago — Atom Trap Trace Analysis (ATTA) has been used to analyze the rare isotope Kr-81 (half-life = 230 kyrs, I.A.  $\sim 10^{-13}$ ) in environmental samples. Kr-81 analysis can now be used to determine the ages of groundwater samples in the range of 50 – 1,000 kyrs. The previous instrument (ATTA-2) had an overall counting efficiency of 0.01% and, required a water sample of 1,000 liters. We are developing a new instrument (ATTA-3) to laser-trap and count Kr-81 atoms with the goal of reaching a counting efficiency of 1%, which would reduce the sample size to less than 100 liters of water or ice. Recently we have demonstrated a counting rate of  $\sim 2000$  <sup>81</sup>Kr atoms/hr, which represents a 100-fold improvement over ATTA-2. ATTA-3 will enable a wide range of applications in the earth sciences.

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