

Towards ^{81}Kr Dating with 20kg of Water

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^{81}Kr is the ideal tracer for old water and ice in the age range of $10^5 - 10^6$ years, with stringent requirements presented by many emerging new applications. To meet the increasing demands from the earth science community, a new, improved ATTA apparatus (see Fig.1) is being developed at the University of Science and Technology of China (USTC). This instrument will be able to analyze more than 300 samples per year and also reduce the sample requirement to 1-2.5 μL STP of krypton gas, which can be extracted from 20-50 kg of water or 8-20 kg of ice. In parallel, the time needed to sample in the field and the size of the sampling machine could also be reduced. A new sampling machine under test at USTC weighs less than 20kg and can be carried by one person. With this new dating tool sharpened, we believe that many more interesting applications can be carried out in collaboration with the earth science communities.

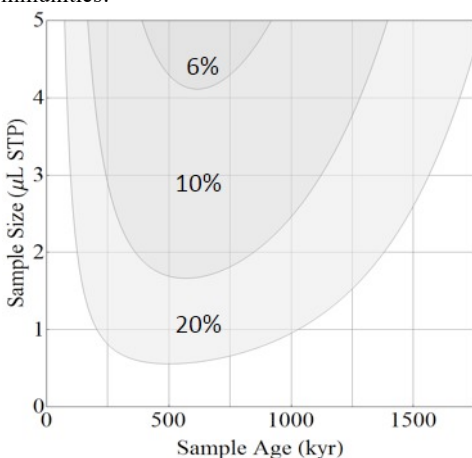


FIG. 1. Projected sample size vs. sample age and desired accuracy for ^{81}Kr dating using the new ATTA instrument currently under development at USTC. The three curves are for a relative age error of $\pm 6\%$, $\pm 10\%$ and $\pm 20\%$, respectively.