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Type: **Oral presentation**

KEYNOTE: Towards ^{81}Kr and ^{39}Ar dating with 1 kg of ice

Tuesday, 4 October 2022 10:30 (30 minutes)

Paleoclimate reconstructions from ice core records can be hampered due to the lack of a reliable chronology, especially when the stratigraphy is disturbed and conventional dating methods cannot be readily applied. The noble-gas radioisotopes ^{81}Kr and ^{39}Ar can in these cases provide robust constraints as they yield absolute, radiometric ages. ^{81}Kr (half-life 229 ka) covers the age range of 30 –1,300 ka, a time span particularly relevant for polar ice cores; ^{39}Ar (half-life 268 a) covers 50 –1,600 a, and is suitable for alpine glaciers. We have developed the Atom Trap Trace Analysis (ATTA) method to analyze both radio-isotopes in ice core samples [1].

^{81}Kr dating, using 5 – 10 kg of ice for each analysis, was recently applied to samples from the TALDICE ice core

By implementing new laser-atom techniques, the ATTA method continues to reduce the required sample size, improv

For more information, please search “ATTA primer” or visit:

<http://atta.ustc.edu.cn/en-us/events/attaprimer.html>

References:

- [1] Z.-T. Lu et al., Tracer applications of noble gas radionuclides in the geosciences. *Ear. Sci. Rev.* 138, 196-214 (2014).
- [2] I. Crotti et al., An extension of the TALDICE ice core age scale reaching back to MIS10.1. *Qua. Sci. Rev.* 266:107078 (2021).
- [3] G. Lee et al., Chronostratigraphy of blue ice at the Larsen Glacier in Northern Victoria Land, East Antarctica. *Cryosphere Discuss.*, under review.
- [4] F. Ritterbusch et al., A Tibetan ice core covering the past 1,300 years radiometrically dated with ^{39}Ar , under review.

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Track Classification: Time scales and methods for ice dating