

Plenary Talk PV II Mon 14:00 Kurt-Alder HS Chemie
Tracing ocean circulation with mass spectrometry: AMS and ATTA in focus — ●NURIA CASACUBERTA AROLA¹, CHRISTOF VOCKENHUBER¹, MARCUS CHRISTL¹, WERNER AESCHBACH², and MARKUS OBERTHALLER² — ¹ETH Zürich, Switzerland — ²University of Heidelberg, Germany

Advancements in Accelerator Mass Spectrometry (AMS) and Atom Trap Trace Analysis (ATTA) have, in recent years, disclosed many fairy tales about ocean circulation. In this talk, I will present a summary of the work that we have been doing at ETH Zürich. This project, TITANICA, aimed at deciphering circulation patterns, transport timescales, and mixing in the Arctic and subpolar North Atlantic oceans by using a novel approach that combines the long-lived radionu-

clides ^{236}U , ^{129}I , ^{14}C , ^{39}Ar . Yet, the big challenge of using these tracers still lies in their precise measurements, owing to their low concentrations in the ocean (i.e., atomic ratios that range from 10^{-8} to 10^{-16} relative to their abundant isotopes, ^{238}U , ^{127}I , ^{12}C , ^{40}Ar). In the last decades, the Laboratory of Ion Beam Physics (ETHZ) and the Kirchhoff-Institut für Physik (University of Heidelberg) have pushed AMS and ATTA performance, respectively, reaching unprecedented precisions, better machine performance, and higher throughput, resulting in comprehensive stories when it comes to ocean circulation and mixing. This talk will thus discuss the potential of combining multiple radionuclide tracers measured with ATTA and AMS technologies, the challenges and successes, and the many adventures that happened between ships and measurement halls.