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Radioactive Molecular Ion Beams at CERN-ISOLDE

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The ISOLDE facility at CERN provides ion beams of nuclides produced in reactions between 1.4-GeV protons and thick targets. Molecules have been studied as a method to deliver beams of release-limited refractory elements by forming volatile molecules [1-5]. Molecular sideband extraction is also used as a technique to improve beam purity. Molecular beams additionally provide opportunities for fundamental physics studies [6-11].

We present our work on molecular ion beam development at ISOLDE and beam composition studies using: the ISOLTRAP Multi-Reflection Time-of-Flight Mass Spectrometer (MR-ToF MS) [12] for identification by ToF mass measurements, online gamma-ray spectroscopy at the ISOLDE tape station [13,14], and off-line alpha- and gamma-ray spectrometry of ion-implanted samples.

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- [1] R. Eder et al., Nucl. Inst. and Meth. B 62, 535 (1992)
- [2] R. Kirchner, Nucl. Inst. and Meth. B 126, 135 (1997)
- [3] H. Frånberg et al., Rev. Sci. Inst. 77, 03A708 (2006)
- [4] J. Ballof et al., Eur. Phys. J. A 55, 65 (2019)
- [5] U. Köster et al., Eur. Phys. J. Special Topics 150, 293 (2007)
- [6] G. Arrowsmith-Kron et al., arXiv, DOI 10.48550/arXiv.2302.02165 (2023)
- [7] T. A. Isaev et al, Phys. Rev. A, 82, 052521 (2010)
- [8] T. A. Isaev et al., arXiv, DOI 10.48550/arXiv.1310.1511 (2013)
- [9] M. Safronova et al., Rev. Mod. Phys. 90, 025008 (2018)
- [10] N. Hutzler et al., arXiv, DOI 10.48550/ARXIV.2010.08709 (2020)
- [11] R. Garcia-Ruiz et al., Nature 581, 396 (2020)
- [12] R. N. Wolf et al., Int. J. Mass Spec. 123, 349 (2013)
- [13] S. Stegemann et al., Nucl. Inst. and Meth. B. Conf. Proc. EMIS XIX (2022)
- [14] R. Catherall et al., J. Phys. G : Nucl. Part. Phys., 44, 094002 (2017)

Funding Agency

Email Address

mia.au@cern.ch

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Yes

Presenter if not the submitter of this abstract

Primary author: AU, Mia (CERN)

Co-authors: MARSH, Bruce (CERN); DÜLLMANN, Christoph E. (Johannes Gutenberg-University Mainz); SCHWEIGER, Christoph (CERN); REIS, Edgar (CERN); WIENHOLTZ, Frank (TU Darmstadt); JOHNSON, Jake (KU Leuven); BALLOF, Jochen (FRIB/MSU); REILLY, Jordan (University of Manchester); WESSOLEK, Julius (CERN); CHRYSALIDIS, Katerina (CERN); NIES, Lukas (University of Greifswald); SCHWEIKHARD, Lutz (University of Greifswald); MOUGEOT, Maxime; ATHANASAKIS-KAKLAMANAKIS, Michail (KU Leuven); SCHLAICH, Moritz (TU Darmstadt); FISCHER, Paul (University of Greifswald); HEINKE, Reinhard (CERN); BERGER, Robert (Philipps-Universität Marburg); ROTHE, Sebastian (CERN); WILKINS, Shane (MIT); STEGEMANN, Simon (CERN); KOESTER, Ulli (ILL); WOJTACZKA, Wiktoria (KU Leuven)

Presenter: AU, Mia (CERN)