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Laser assisted decay spectroscopy of ^{178}Au at the ISOLDE Decay Station

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Laser-assisted decay spectroscopy of ^{178}Au at the ISOLDE Decay Station

C. A. A. Page *

University of York (UK).

In the region around the $Z=82$ shell closure and the $N = 104$ midshell, competition between spherical and deformed configurations leads to the phenomenon of shape coexistence [1]. Previous work (e.g. [2]) has sought to understand the structure of isotopes of gold ($Z=79$) to establish the extent to which such competition dictates their characteristics. A recent laser spectroscopy study [3] has shown that ^{178}Au has two isomers, one of high and one of low spin and different deformations [4].

In August 2021, a decay spectroscopy experiment was performed [5] using the ISOLDE Decay Station (IDS) with isomerically pure beams of ^{178}Au provided by RILIS. The isomeric selectivity combined with high γ energy resolution and efficiency of IDS were necessary for making such measurements due to the extremely low α branching ratios of some decay paths. Through β decay, it is also possible to study different sets of states of ^{178}Pt populated by the two ^{178}Au isomers. This contribution will comprise a summary of the experimental techniques used to collect these data and an overview of the determined structures of ^{178}Au and ^{178}Pt .

[1] K. Heyde and J. L. Wood Rev. Mod. Phys. 83, 1467 (2011)

[2] P. M. Davidson et al., Nuclear Physics A 657 219-250 (1999)

[3] J. G. Cubiss et al., Phys. Rev. C 102, 044332 (2020)

[4] J. G. Cubiss et al., submitted to PRL

[5] B. Andel, A. N. Andreyev, A. E. Barzakh, J. G. Cubiss, P. Van Duppen et al, IS665 experiment at ISOLDE August 2021

*On behalf of the RILIS-IDS collaboration

Author: PAGE, Christopher (University of York (GB))

Presenter: PAGE, Christopher (University of York (GB))

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