Element 115 studied with TASISpec

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An experiment was conducted at GSI to fingerprint the proton number of one or several isotopes along anticipated decay chains of element 115 by means of high-resolution coincidence spectroscopy of α decays and photons. The fusion-evaporation reaction ^{48}Ca+^{243}Am [1] was used. The residues were separated from primary beam and background by TASCA [2-4] and guided into the TASISpec set-up [cf. Fig. 1(a)] [5, 6].

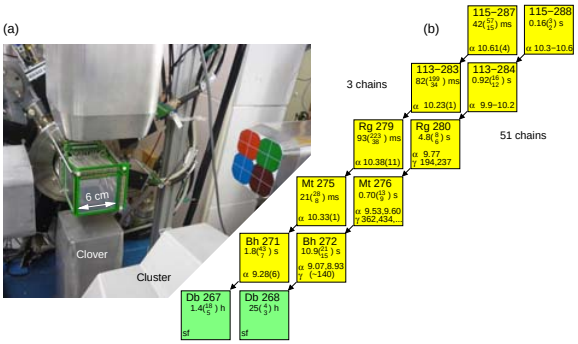

Figure 1: (a) Photograph of the TASISpec α-photon coincidence set-up [5] in the focal plane of the TASCA gas-filled separator at GSI [2]. See text for details. (b) Proposed decay chains of ^{287,288}115 based on the combined data and assignments of Refs. [7-9].

22 and 1 correlated decay chains were found to be consistent with 31 and 2 previously reported chains associated with ^{288}115 and ^{287}115, respectively [cf. Fig. 1(b)] [7, 8]. 16 prompt α-photon coincidences were recorded along the ^{288}115 chain [9-11]. Seven short chains of types recoil-α-(α)-fission deserve specific attention [12].

The conclusion of Ref. [9] notes that "thirty correlated α-decay chains were observed following the reaction ^{48}Ca+^{243}Am. Decay schemes arising from high-resolution spectroscopic coincidence data, in conjunction with comprehensive Monte-Carlo simulations, open the door for direct nuclear structure insights of these heaviest man-made atomic nuclei. Previous assignments linking the majority of the decay chains to the decay of ^{287,288}115 [7, 8] are confirmed. This includes first candidates for Z-fingerprinting the decay of Mt by means of characteristic K-X ray detection. There is clearly potential for direct determination of the atomic number of the descendants of superheavy elements."

Following press releases the topic received significant media attention [13], not least due to precisely element 115 starring in various computer games – and Area 51 [14].

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[13] http://www.fysik.lu.se/om_institutionen/nyheter/nyheter_2013/element-115-news-feed/ (selection of news articles).
[14] http://www.youtube.com/watch?v=mpmAXO2-gSo
http://www.youtube.com/watch?v=BJYDrugEtxY
http://www.youtube.com/watch?v=q0lSL1yD5qQ
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