

# The first steps in in-trap conversion electron spectroscopy

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REX-ISOLDE COLLABORATIONS

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First feasibility tests of in-trap conversion electron spectroscopy were performed at the ISOLDE facility in 2000-2001 [1,2]. The Penning trap REXTRAP of the REX-ISOLDE post accelerator was used in these tests. The results of the simulations, the experiments with implanted conversion electron source, as well, as first on-line tests with trapped radioactive ions are presented. Three radioactive ions, <sup>116m2,118m2</sup>In isomers and alpha-decaying <sup>221</sup>Fr, were studied in these tests. In addition to demonstration of the feasibility, the detection of conversion electrons was found to be a useful diagnostic tool for the trap operation. The feasibility experiments revealed some problems associated with specific properties of the REXTRAP.

The experiments were continued in 2005-2007 at the IGISOL facility, University of Jyväskylä. The JYFLTRAP was used for this purpose. High resolution spectroscopic data from several trapped radioactive ions was taken. The shortest-lived isomer studied in this work was <sup>117m</sup>Pd with a half-life of 19.1ms, for which a superior peak-to-total ratio and an excellent line shape at the 9.9 keV conversion electron line have been obtained.

The future possible applications of in trap electron spectroscopy for nuclear and atomic fields are discussed.

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[2] L. Weissman, F. Ames, J. Aysto, O. Forstner, K. Reisinger, S. Rinta-Antila, Nucl. Instr. And Meth. A 492 (2002) 451.

[3] J. Rissanen, V.-V. Elomaa, T. Eronen, J. Hakala, A. Jokinen, S. Rahaman, S. Rinta-Antila, and J. Aysto, Eur. Phys. J. A 34, 113–118 (2007)

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