Contribution ID: **35** Type: **Oral presentation**

# Charged-particle decay studies in the $^{100}$Sn region

*Tuesday 22 May 2018 11:20 (20 minutes)*

The region of $\alpha$ decaying nuclei close to $^{100}$Sn offers a unique opportunity to study $\alpha$ decays, where the valence nucleons occupy the same orbitals. This might give a rise to exceptionally high $\alpha$-particle preformation factor, leading to very fast $\alpha$ decay. This kind of enhanced $\alpha$ decay was suggested already in 1965 [1], however, to date there is no confirmation for the existence of this so called superallowed $\alpha$ decay. The most enhanced known $\alpha$ emitter is $^{212}$Po, however, this case is lacking the $N = Z$ symmetry. The $\alpha$ decays of $^{112}$Ba, $^{108}$Xe, and $^{104}$Te are expected to compete for the fastest known $\alpha$ decay [2].

The astrophysical $rp$-process has been proposed to terminate with rapid $\alpha$ decays of proton rich tellurium isotopes. The details of the termination depends on the single proton separation energies of antimony isotopes [3]. These energies can be probed indirectly by measuring the proton and $\alpha$-decay energies in this region.

In this presentation, preliminary results of an experiment performed at ATLAS, Argonne National Laboratory, using the Fragment Mass Analyzer (FMA) to study charged-particle decays in the $^{100}$Sn region will be presented.

[1] R. Macfarlane *et al.*, Phys. Rev. Lett. 14, 4 (1965)
[2] P. Mohr, Eur. Phys. J. A 31, 23 (2007)
[3] C. Mazzocchi, *et al*, Phys. Rev. Lett. 98, 212501 (2007)

This work is supported by the U.S Department of Energy, Office of Science, Office of Nuclear Physics, under contract number DE-AC02-06CH11357.

**Primary authors:** AURANEN, K. (Argonne National Laboratory); SEWERYNIAK, D. (Argonne National Laboratory)

**Co-authors:** ALBERS, M. (Argonne National Laboratory); ALCORTA, M. (Argonne National Laboratory); AYANGEAKAA, A. (Argonne National Laboratory); BOTTONI, S. (Argonne National Laboratory); CARPENTER, M.P. (Argonne National Laboratory); CHIARA, C.J. (Argonne National Laboratory); COPP, P. (University of Massachusetts); DAVID, H.M. (Argonne National Laboratory); DOHERTY, D. (University of Edinburgh); HARKER, J. (University of Maryland); HOFFMAN, C. (Argonne National Laboratory); JANSSENS, R.V.F. (Argonne National Laboratory); KHOO, T.L. (Argonne National Laboratory); KUVIN, S. (Argonne National Laboratory); LAURITSEN, T. (Argonne National Laboratory); LOTAY, G. (University of Surrey); ROGERS, A. (Argonne National Laboratory); SETHI, J. (University of Maryland); SCHOLEY, C. (University of Jyväskylä); TALWAR, R. (Argonne National Laboratory); WALTERS, W.B. (University of Maryland); WOODS, P.J. (University of Edinburgh); ZHU, S. (Argonne National Laboratory)

**Presenter:** AURANEN, K. (Argonne National Laboratory)

**Session Classification:** session 2