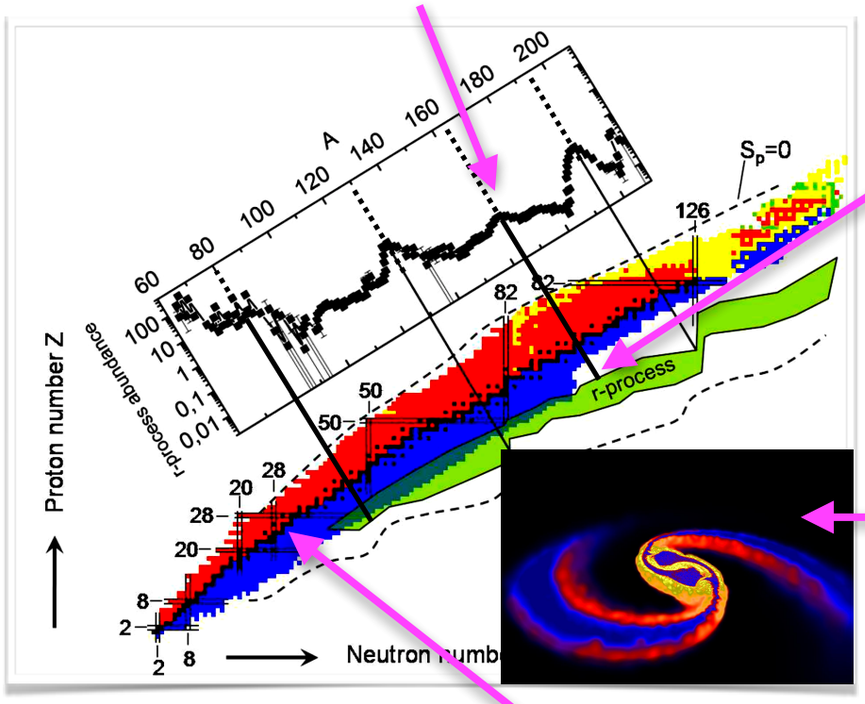
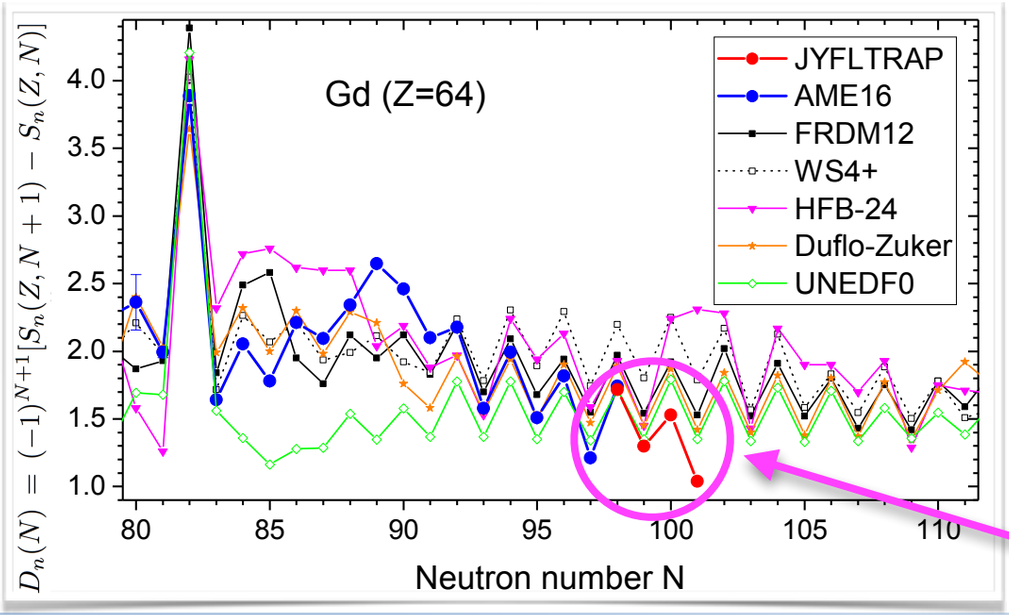
Improving *r*-process calculations through precision mass measurements using JYFLTRAP - M. Vilen, **J.M. Kelly** *et al.*

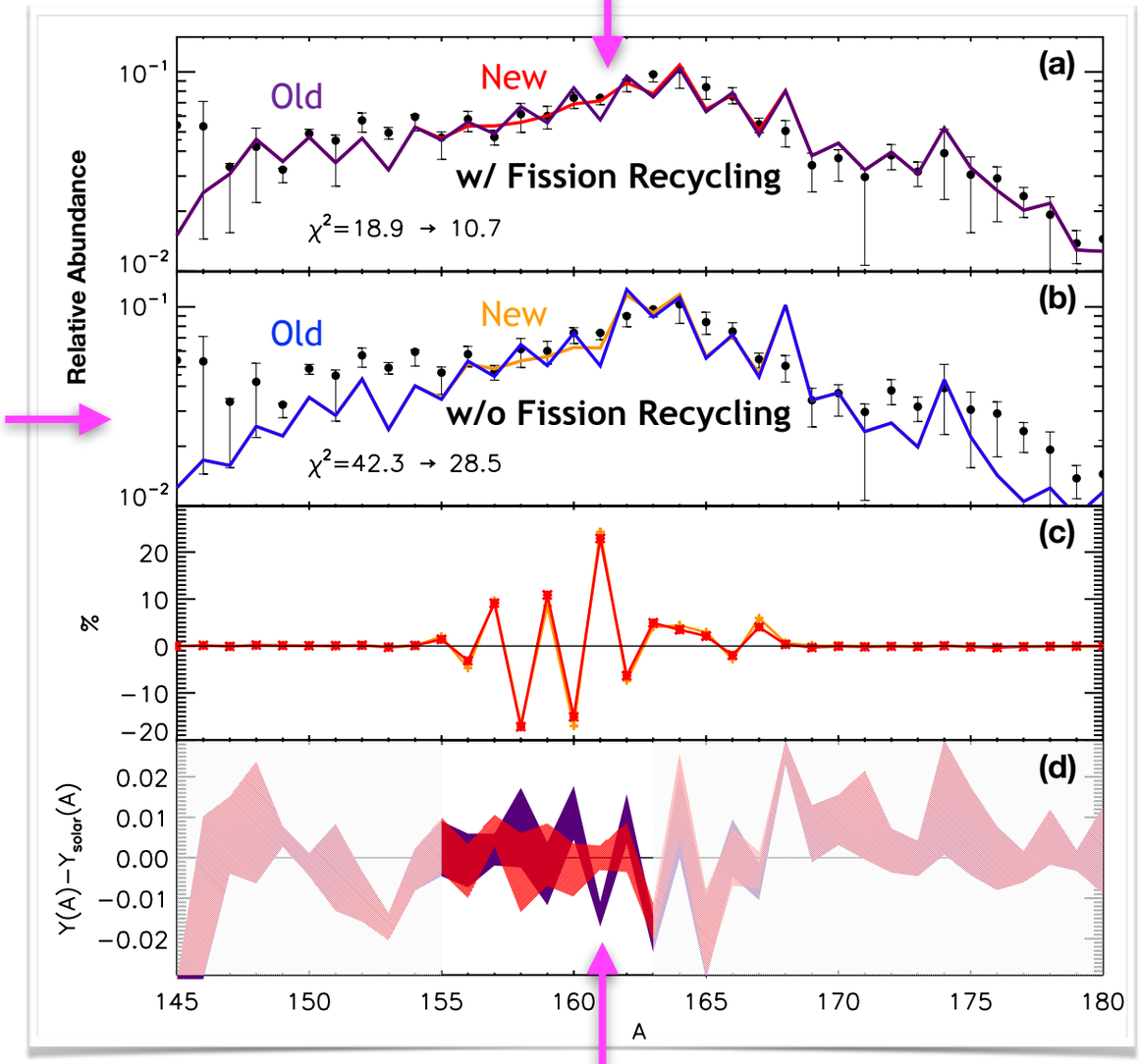
- Rare-earth peak formation depends sensitively on atomic masses in this region of nuclear deformation.



- Measured for the 1st time six masses, and improved precisions on six others, using JYFLTRAP Penning trap at the University of Jyväskylä
- NS merger environment confirmed as one astrophysical site by recent multi-messenger observations.
- Half of elements heavier than iron produced by the rapid neutron capture process, which proceeds in uncharted territory.
- D_n reduction seen across all measured isotopic chains, impacting final abundances.



- Smoothening of odd-even staggering results in closer match to solar abundances.



- Final abundance changes due to recalculated neutron capture rates using new S_n values.
- Our new masses reduce the pairing gap, D_n, relative to mass models.

M. Vilen, J.M. Kelly, A. Kankainen, M. Brodeur, A. Aprahamian, L. Canete, T. Eronen, A. Jokinen, T. Kuta, I.D. Moore, M.R. Mumpower, D.A. Nesterenko, H. Penttilä, I. Pohjalainen, W.S. Porter, S. Rinta-Antila, R. Surman, A. Voss, and J. Äystö, PRL **120** 262701 (2018)