

UNCERTAINTY-QUANTIFIED REACTION MODELING VIA DATA-DRIVEN MULTI-OBJECTIVE OPTIMIZATION.

Georgios Perdikakis¹ Nikolaos Dimitrakopoulos¹ Fernando Montes²
Panagiotis Gastis³ Sean Kuvin³ Hye Young Lee³ Pelagia Tsintari^{2,4}
Alexander Voinov⁵

¹Central Michigan University

²Facility for Rare Isotope Beams

³Los Alamos National Laboratory

⁴Michigan State University

⁵Ohio University

Session VI: AI/ML for Nuclear Data: Opportunities and Challenges
February 11, 2026



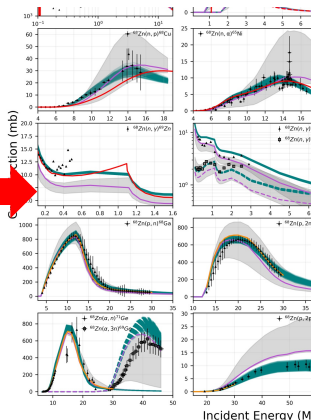
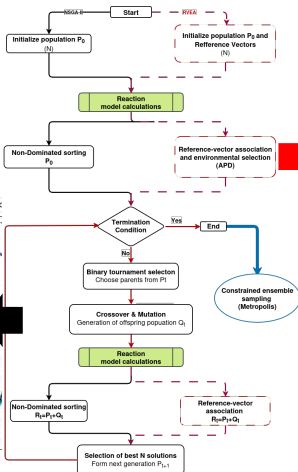
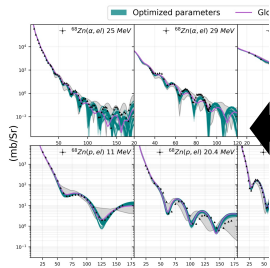
U.S. DEPARTMENT OF
ENERGY

Office of
Science

GOAL: ESTIMATED STATISTICAL MODEL PARAMETERS WITH QUANTIFIED UNCERTAINTIES

SIMULTANEOUSLY FIT EXFOR DATA TO OPTIMIZE OMP AND NLD PARAMETERS

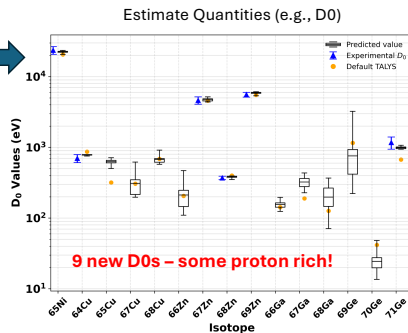
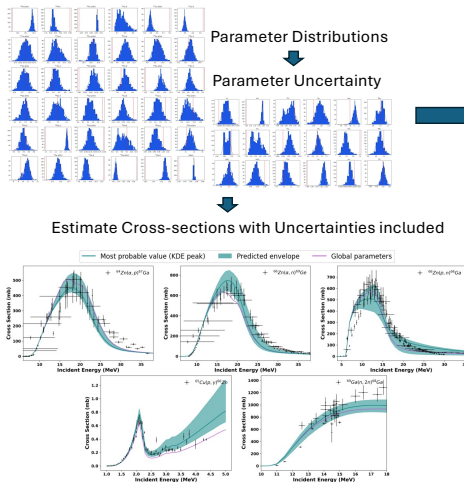
32	66 Ge	67 Ge	68 Ge	69 Ge (α,3n)	70 Ge	71 Ge (α,n)	72 Ge
31	65 Ga	66 Ga (p,3n)	67 Ga (p,2n)	68 Ga (p,n)	69 Ga (p,γ)	70 Ga	71 Ga
30	64 Zn	65 Zn	66 Zn	67 Zn	68 Zn (Target)	69 Zn (n,γ)	70 Zn
29	63 Cu	64 Cu (p,X)	65 Cu	66 Cu	67 Cu (p,2p)	68 Cu (n,p)	69 Cu
28	62 Ni	63 Ni	64 Ni	65 Ni (n,α)	66 Ni	67 Ni	68 Ni
	34	35	36	37	38	39	40
	Neutron Number (N)						



Dimitrakopoulos et al, PRC, under revision

RESULTS

CAN WE MAKE PREDICTIONS WITH QUANTIFIED UNCERTAINTIES?



(Dimitrakopoulos et al, PRC, under review)