

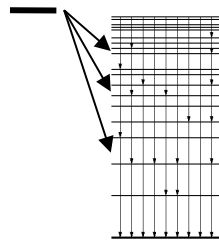
Evolutionary algorithms applied to the analysis of β -decay TAGS data (J.L. Tain)



TAGS inverse problem:
very large dimension and highly non-linear

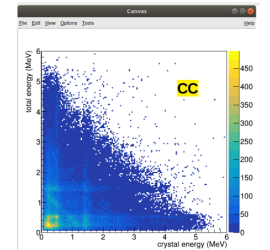
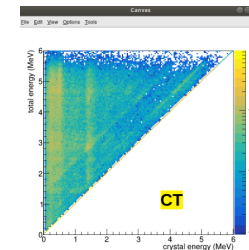
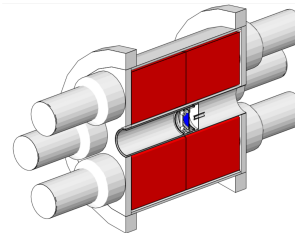
$$d_i = \sum_j R_{ij} f_j$$

$$R_j = \sum_{k=0}^{j-1} b_{jk} g_{jk} \otimes R_k$$

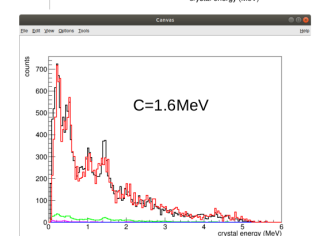
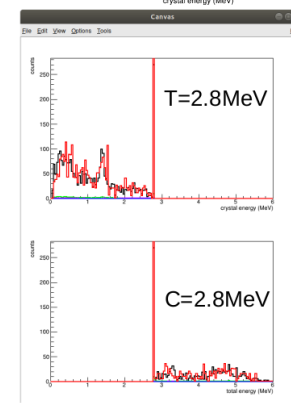
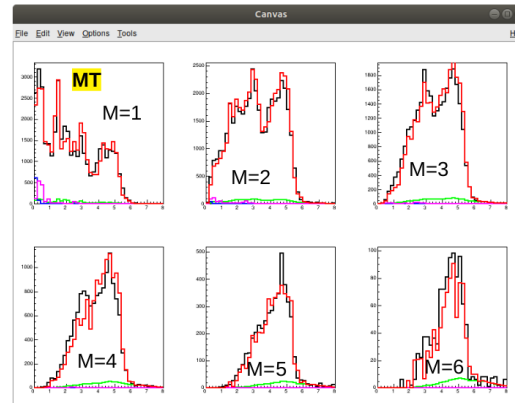


Until now:

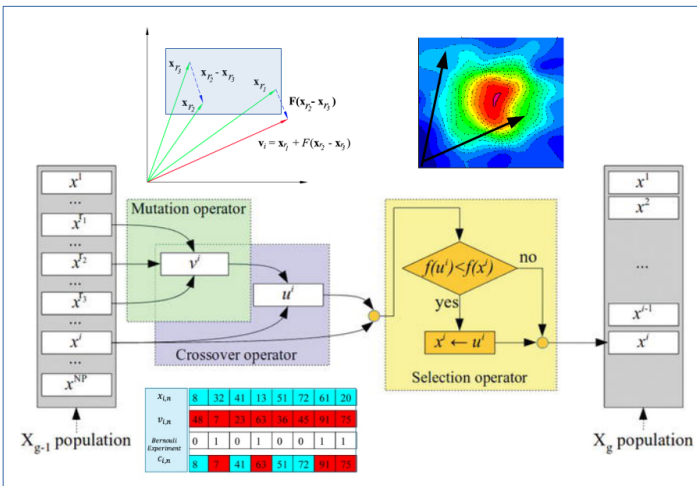
- Algorithm implementation and optimization (including response generation)
- Test with segmented TAGS data ($n_{\text{par}} \sim 10^3$: memory/computing-speed demanding)



Differential Evolution (R. Storn, 1996): target \rightarrow mutation \rightarrow donor \rightarrow recombination \rightarrow offspring \rightarrow selection \rightarrow new target



Fit to all data types!



Next steps:

- Further optimization (parallelization) + ARTEMISA
- Alternative strategies of fit parameter definition ($b_{jk} \rightarrow$ NLD + PSF: physics output!)
- Application of AI for adaptive DE control parameter evolution

Simple. Fast. Few control parameters. Many variants.