Poster P115

First Results on Photon Strength Functions of ^{78}Se from the Two-Step Gamma Cascades Measurement

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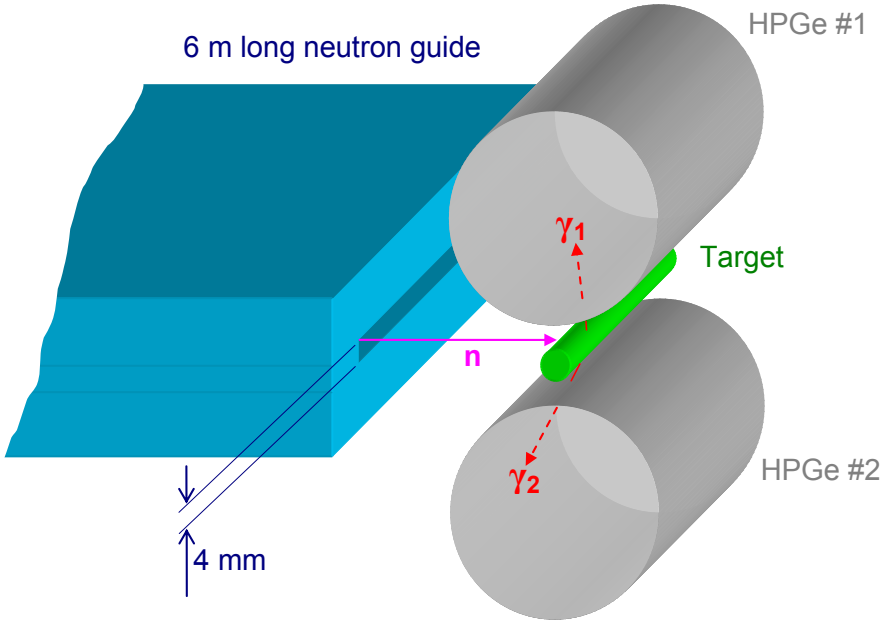
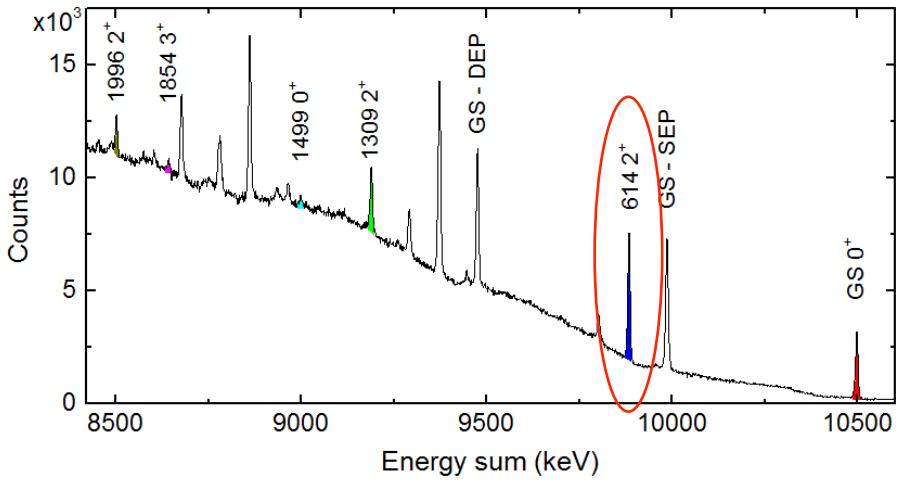
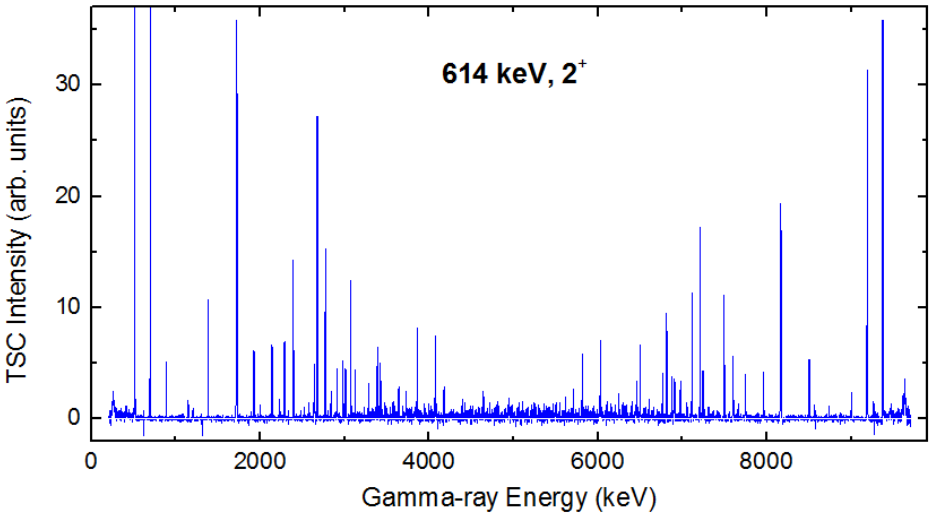
TSC experiment:



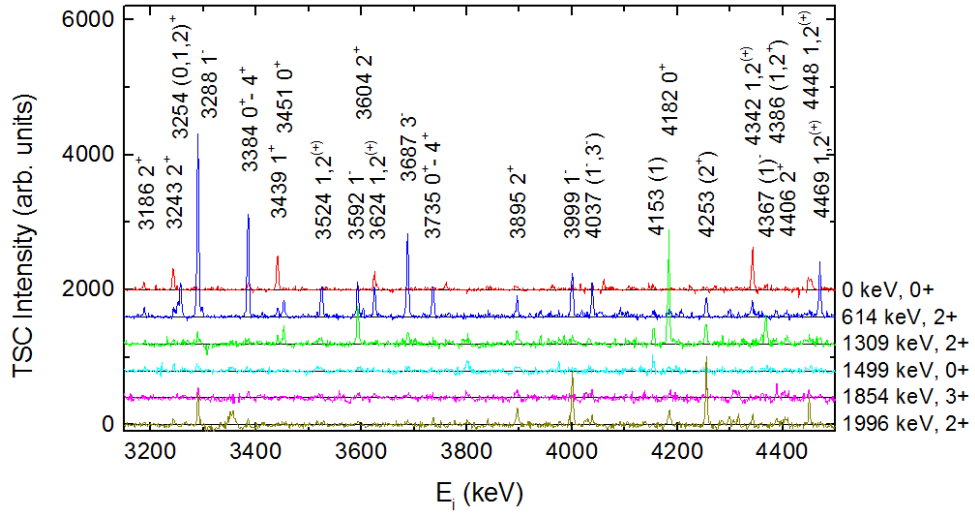
Spectrum of energy sums



(Background free) TSC spectrum
from one detector
under the condition on energy sum



Spectra to several "final states" prepared

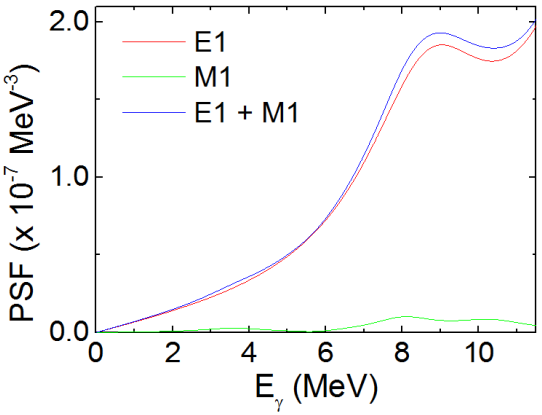


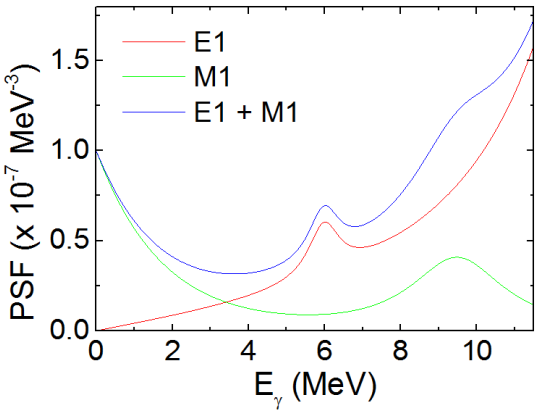
- Coincidence spectra can be used for spectroscopic purposes – many peaks visible in spectra for "lighter" nuclei

- There is also a contribution from "unresolved" peaks – the spectra can be used to get information on Photon Strength Functions (PSFs) and Nuclear Level Density (NLD)

- Comparison of experimental spectra with statistical model simulations under various assumptions on PSFs and NLD
- Simulations performed using Monte-Carlo code DICEBOX – allows simulation of expected fluctuations of intensities (Porter-Thomas)
- TSC spectra binned to broader bins to suppress fluctuations and experimental uncertainties
- The "best" model can not be obtained but wrong models can be rejected

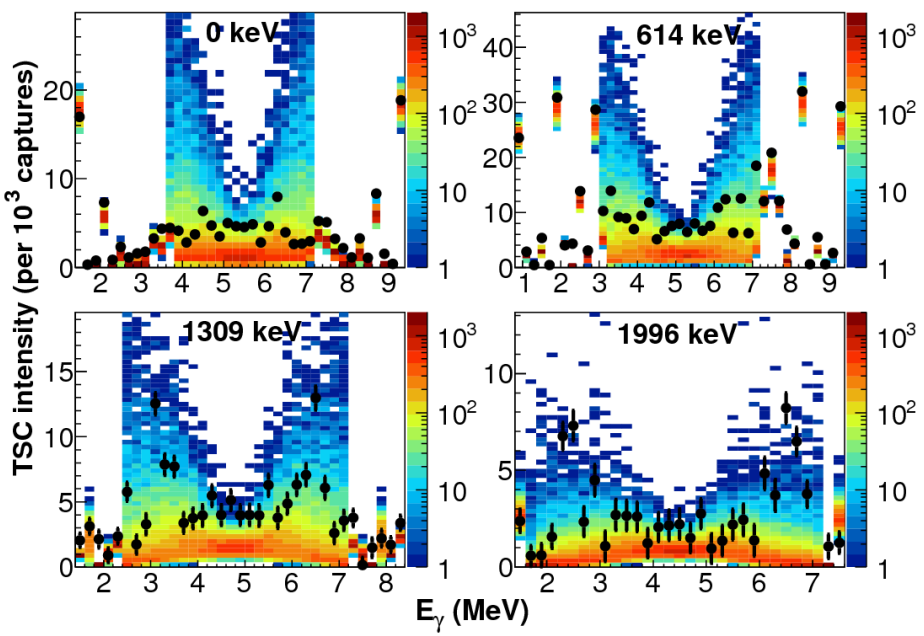
Simulations for several PSFs/NLD models

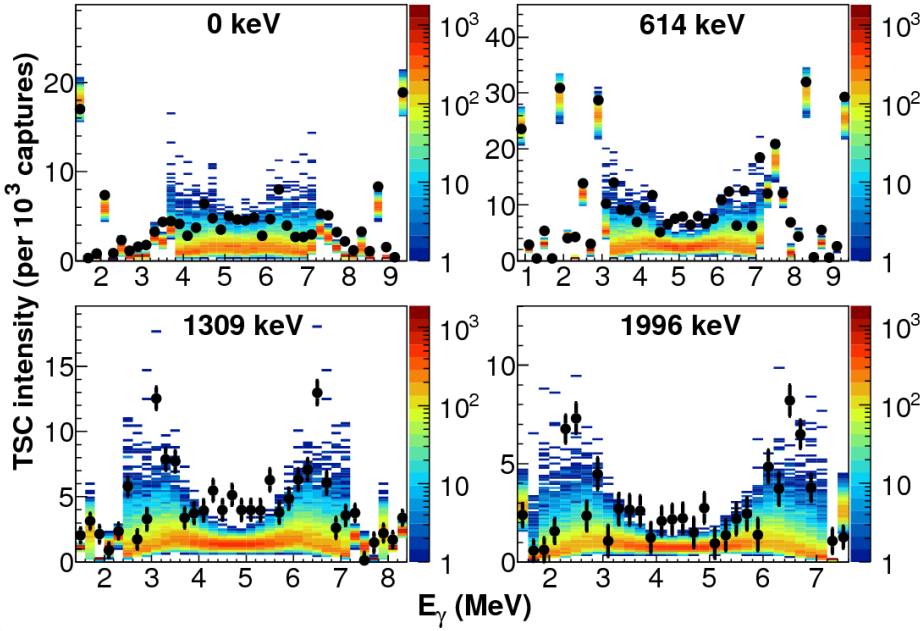


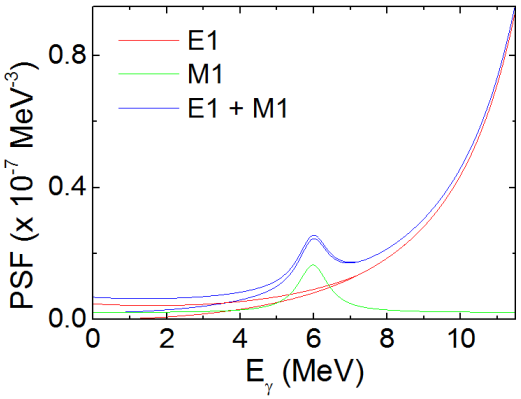


PSFs model combination based on NRF data - Lorentzian extrapolation of E1 PSF used for low E_g

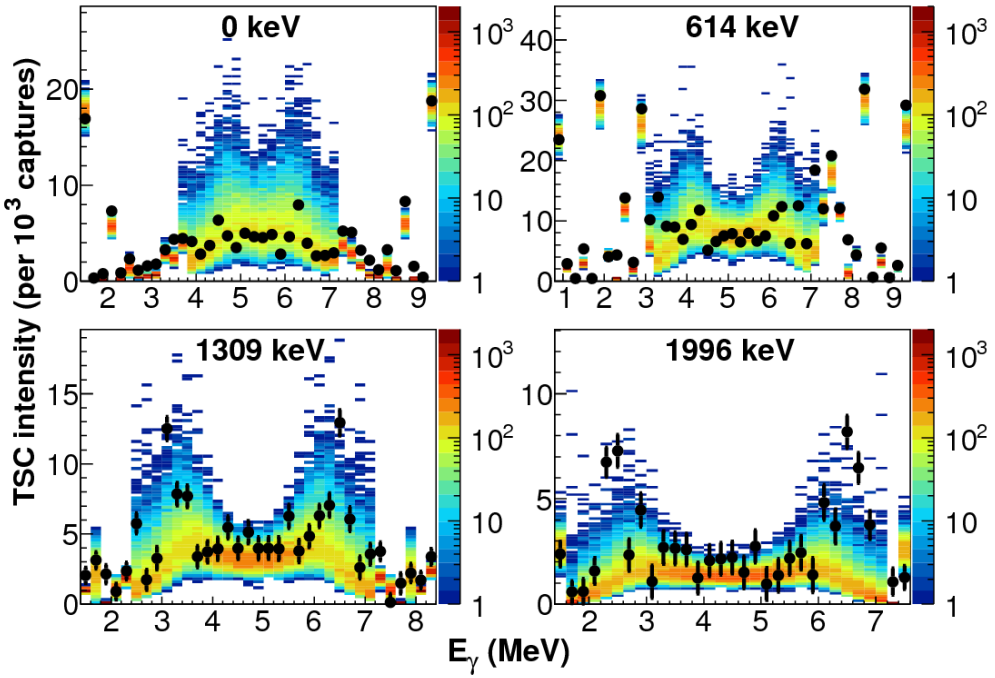
PSFs combination with a strong low-energy PSF enhancement - model based on PSF from “Oslo-type” experiments.







Reasonable reproduction of data - based on T-dependent KMF model (E1) and a single-particle plus spin-flip combination of M1 PSF



Main Conclusions:

- Only relatively "flat" PSF models, very likely with a resonance structure near 6.5 MeV can reproduce TSC spectra - postulation of a resonance gives similar predictions for both transition types (E1 or M1)
- Lorentzian PSF shape strongly prefers high-energy primaries – predicts too low intensity in the middle of TSC spectra
- Any strong low-energy enhancement significantly increases the multiplicity of the decay - weak enhancement (at most 4-5x weaker) might be likely possible

If you want to see me, come to poster P115…