Compton scattering

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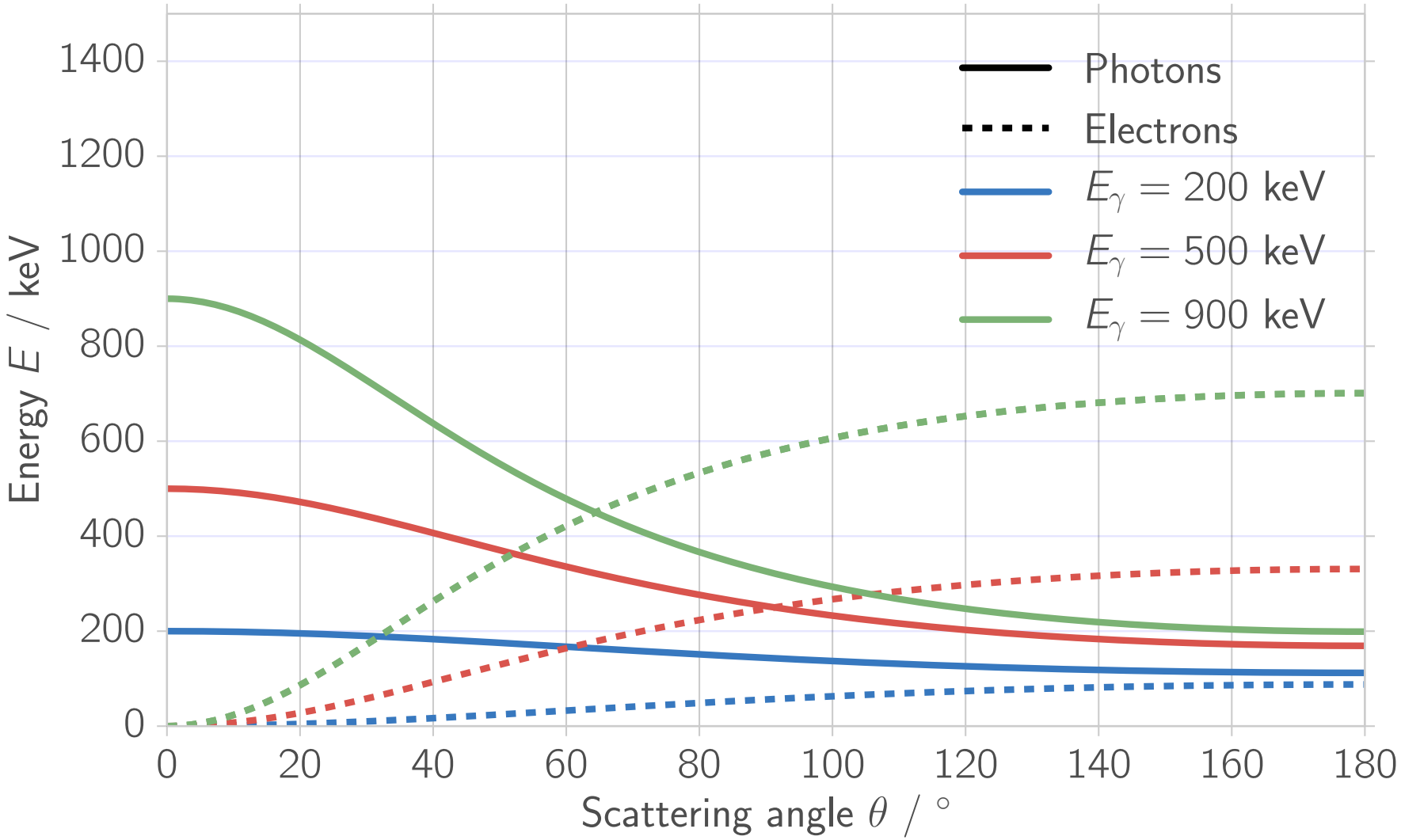
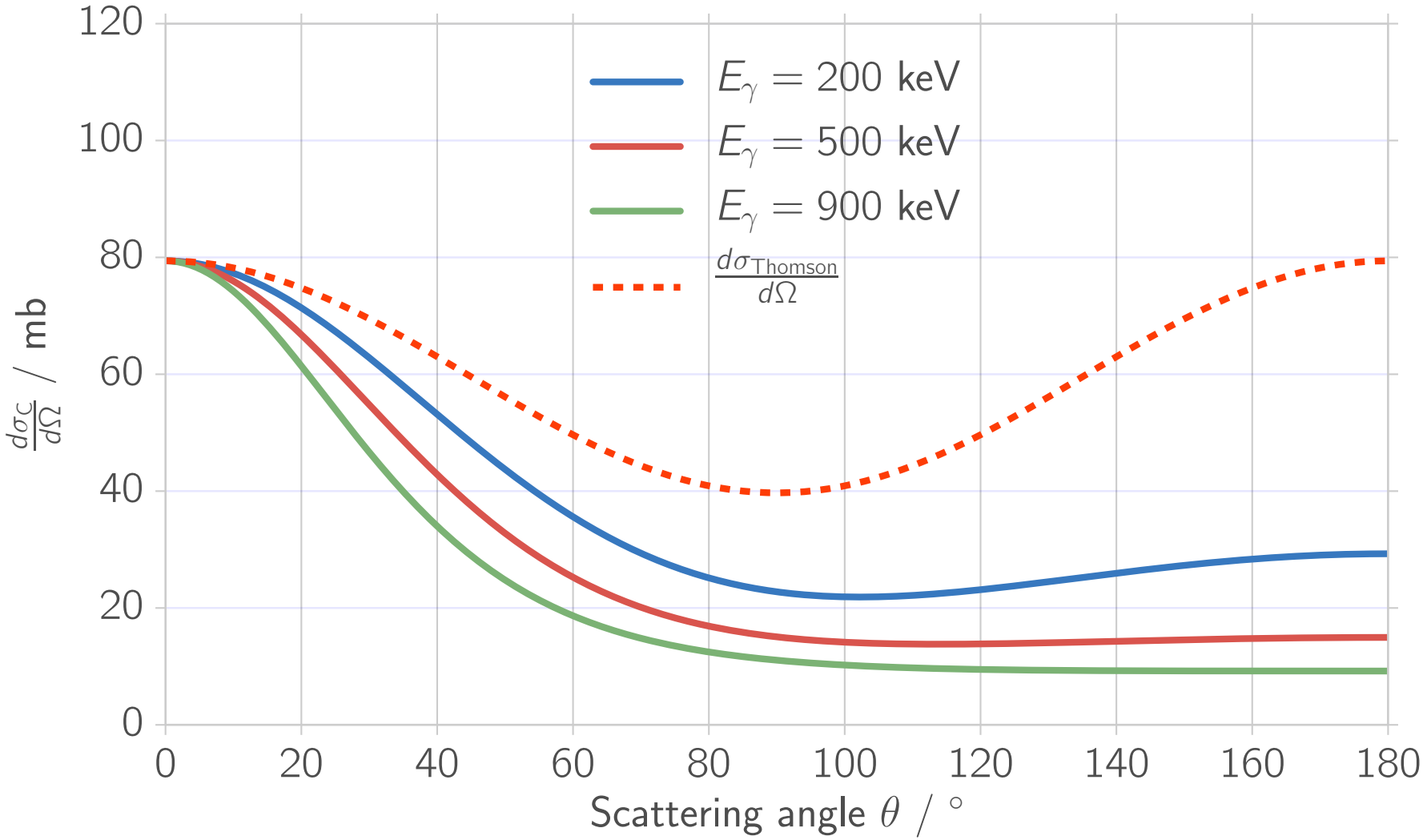
Inhaltsverzeichnis

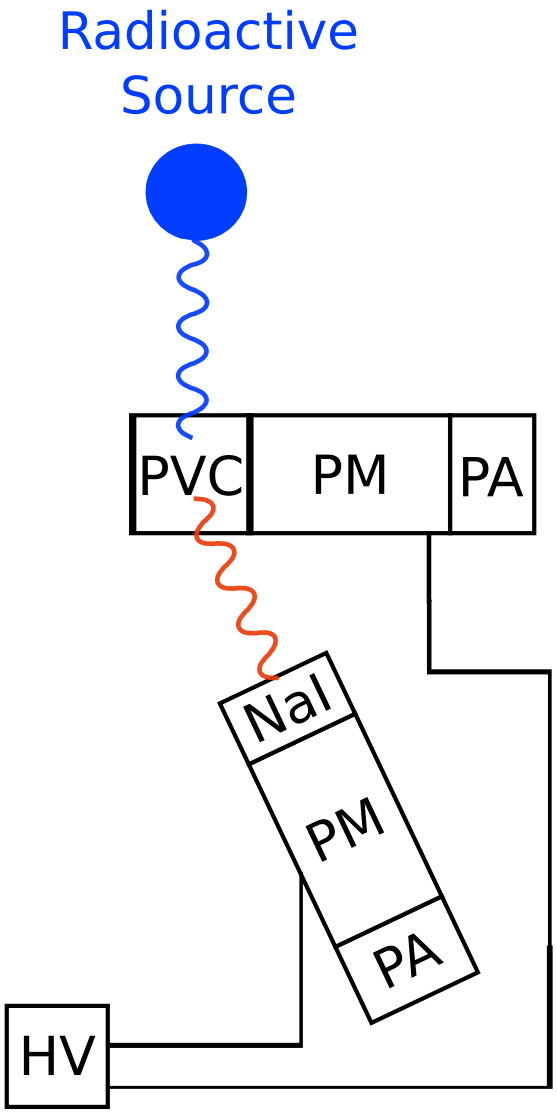
Compton Streuung – Energieerhaltung



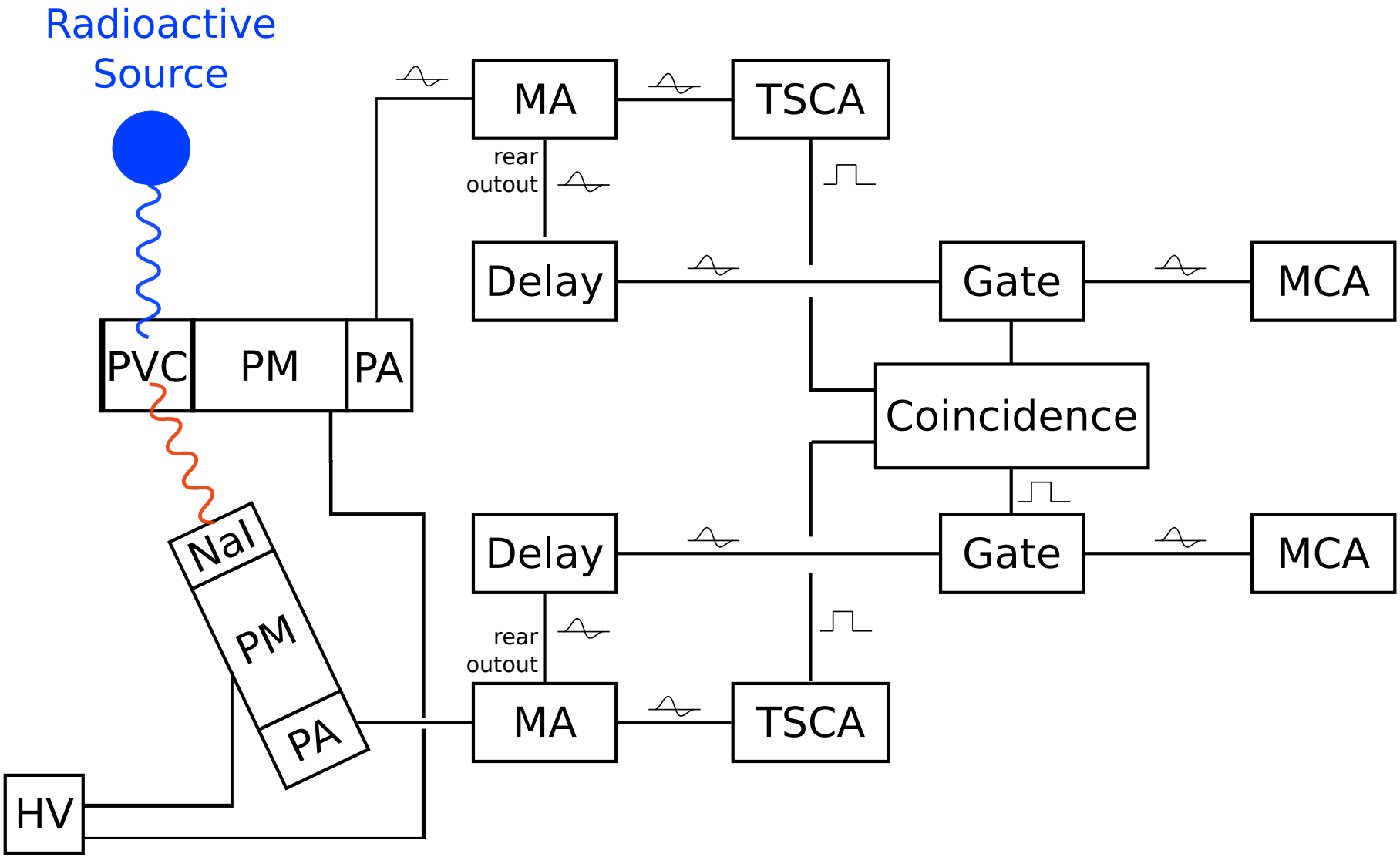
Compton Streuung – Diff. Wirkungsquerschnitt



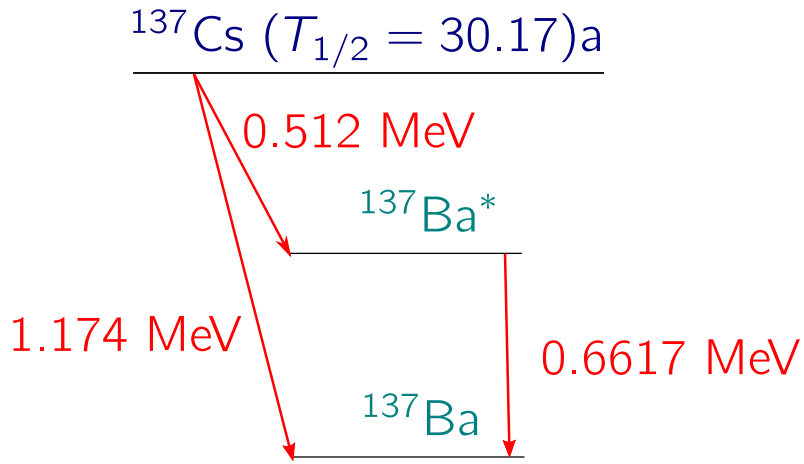
Aufbau ohne Elektronik

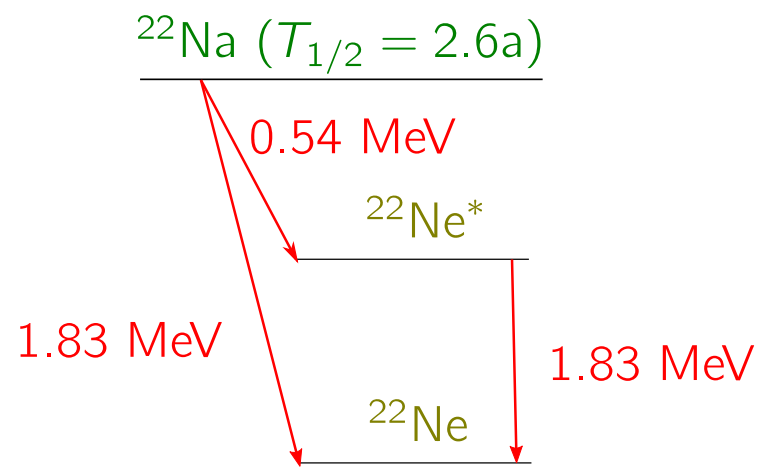


Aufbau mit Elektronik



Zerfallsschemata von ^{137}Cs und ^{22}Na

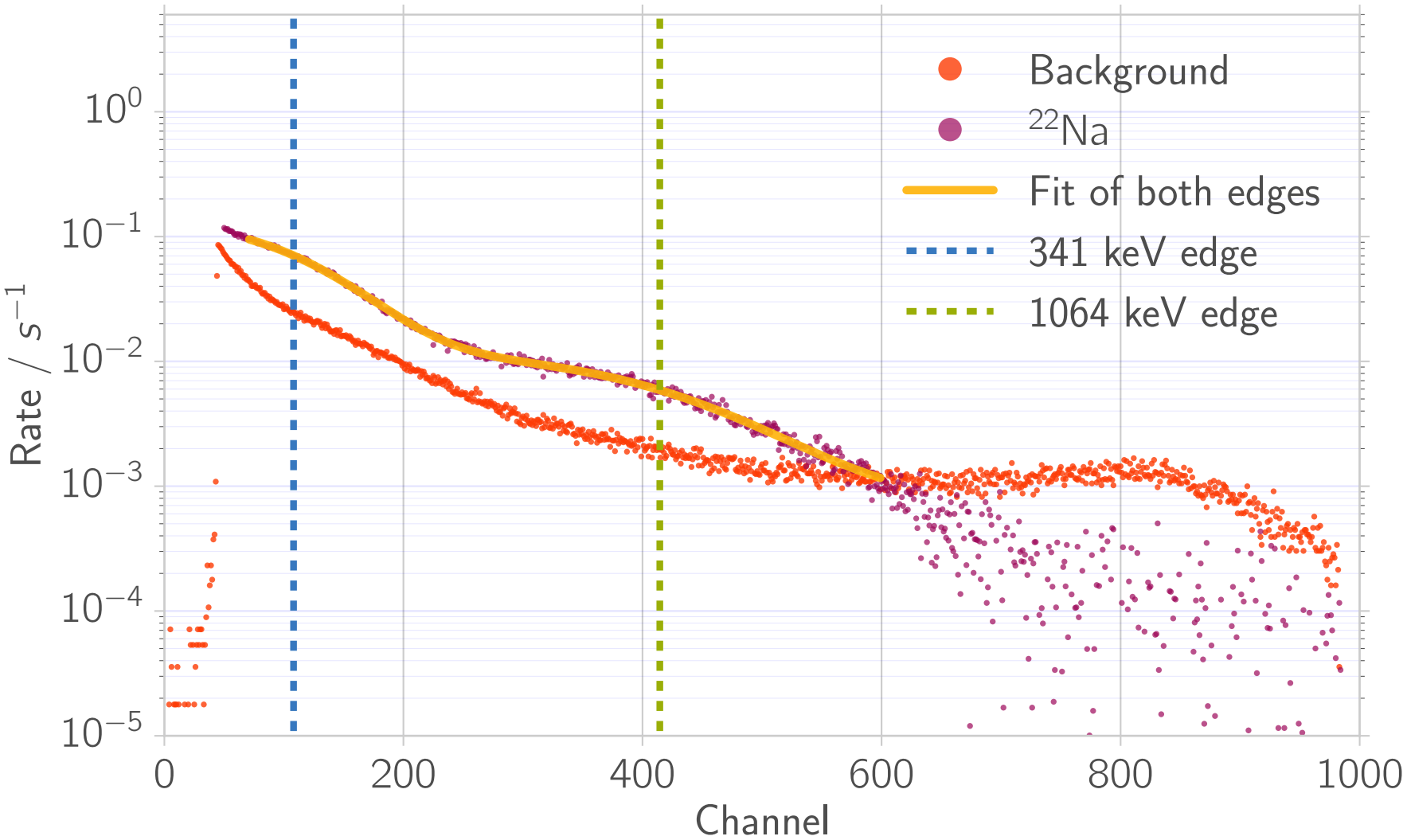




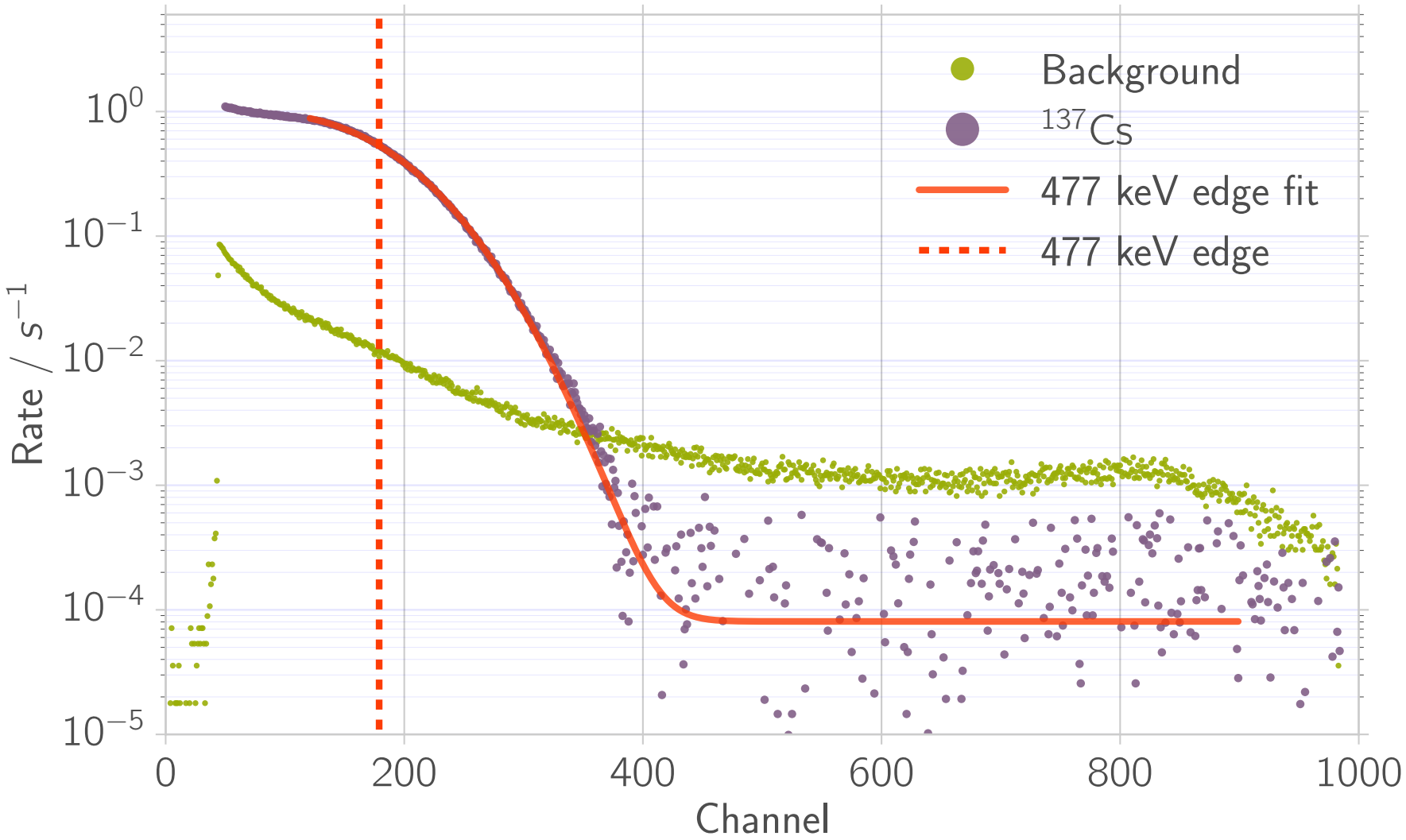
Sichtbare Peaks und Kanten für beide Szintillisatoren

Probe	Peak/Kante	E / keV	NaI Szinti	PCV Szinti
^{137}Cs	Photo	662	sichtbar	
	Compton	477	sichtbar	sichtbar
	Rückstreu	183	sichtbar	
^{22}Na	Photo	511	sichtbar	
	Compton	341	sichtbar	sichtbar
	Photo	1277	sichtbar	
	Compton	1064	sichtbar	sichtbar

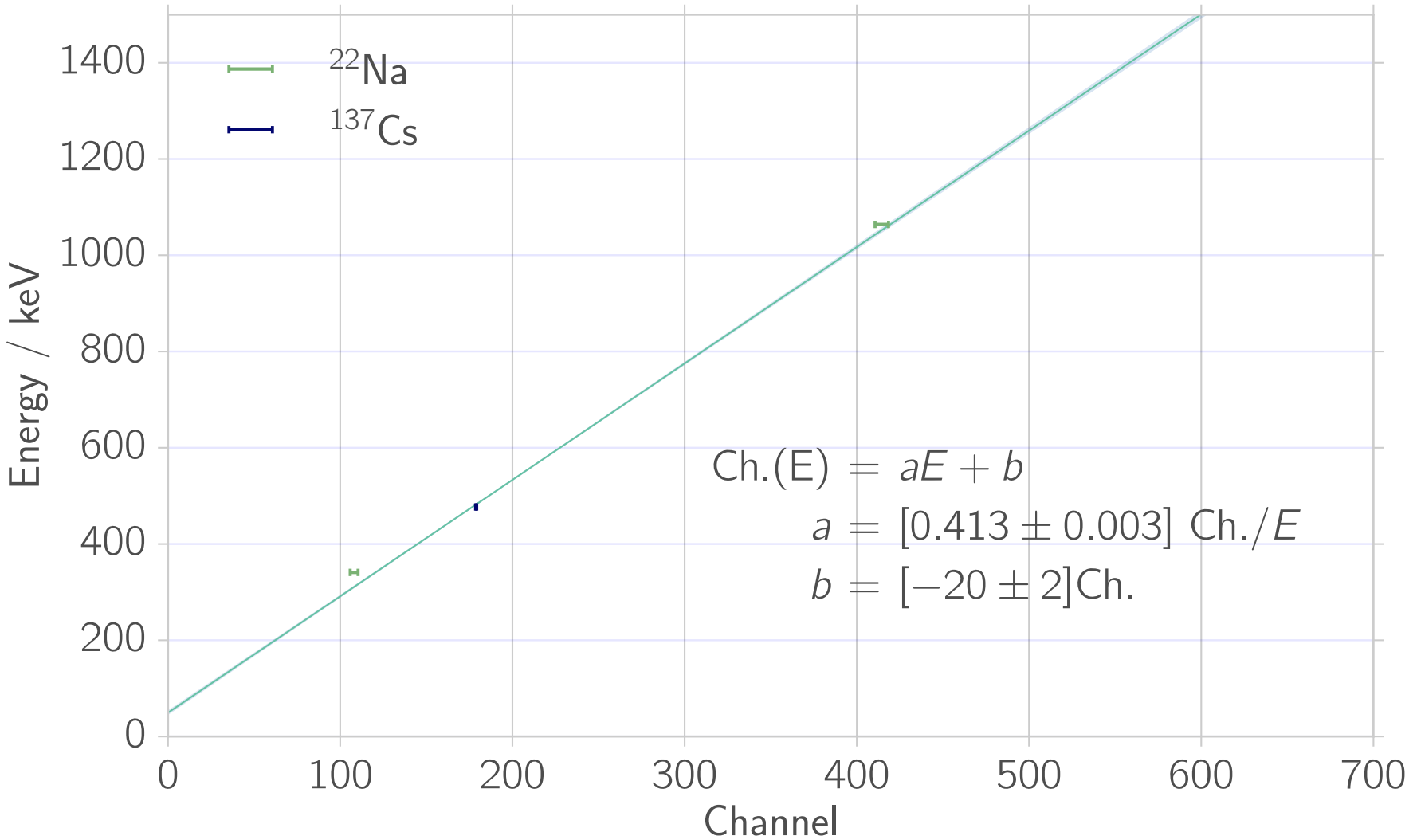
^{22}Na sample (measurement time 16.5h)



^{137}Cs sample (measurement time 6h)



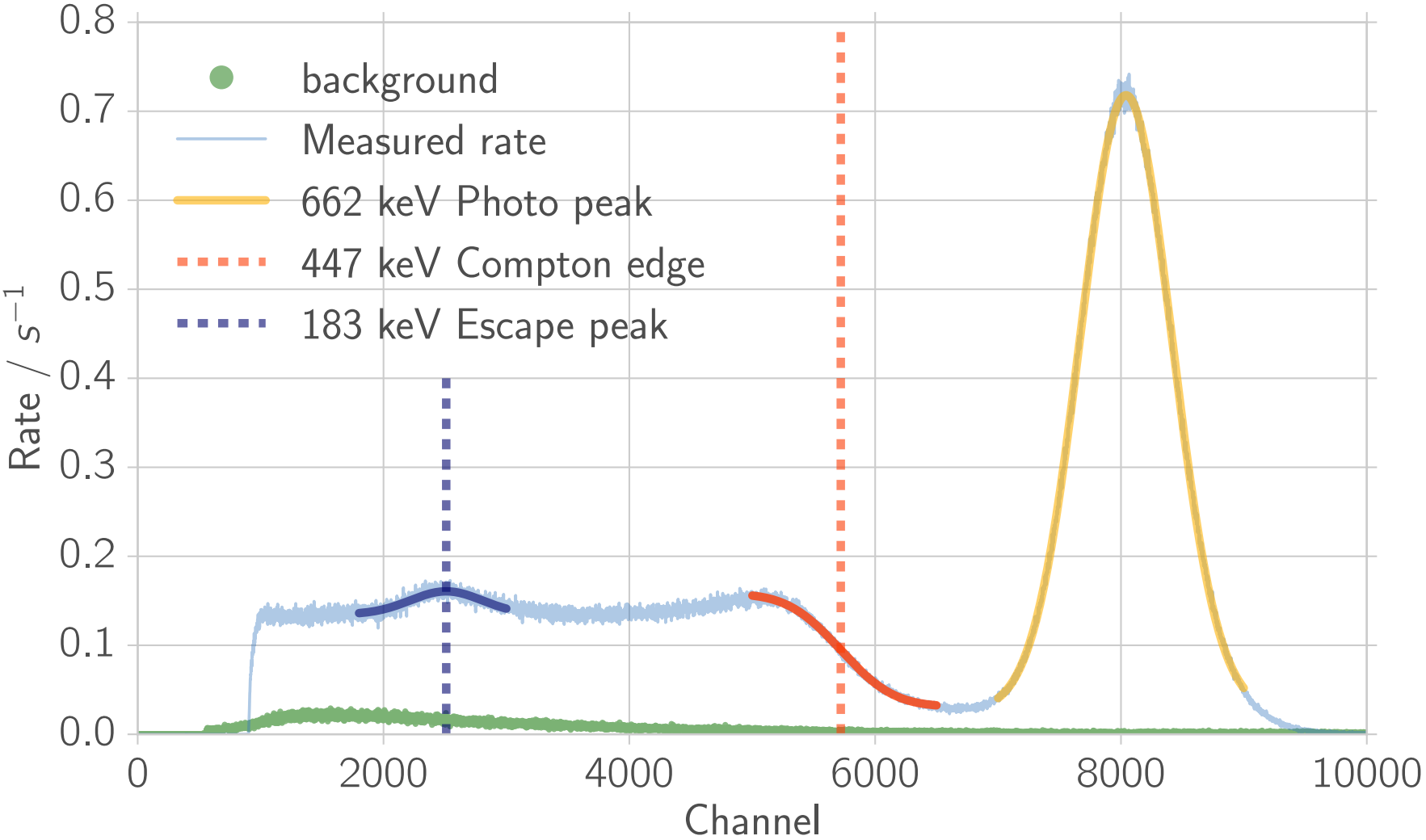
Linear fit


^{22}Na
^{137}Cs
Energy / keV
Channel
0
200
400
600
800
1000
1200
1400
0
100
200
300
400
500
600
700
Ch.(E) = $aE + b$
$a = [0.413 \pm 0.003]$ Ch./E
$b = [-20 \pm 2]$Ch.

Peaks and fitting results of ^{137}Cs

Name	Energy	Channel
Photo peak	662 keV	8040.59 ± 0.03
Compton edge	477 keV	5720 ± 4
Escape peak	183 keV	2510 ± 12

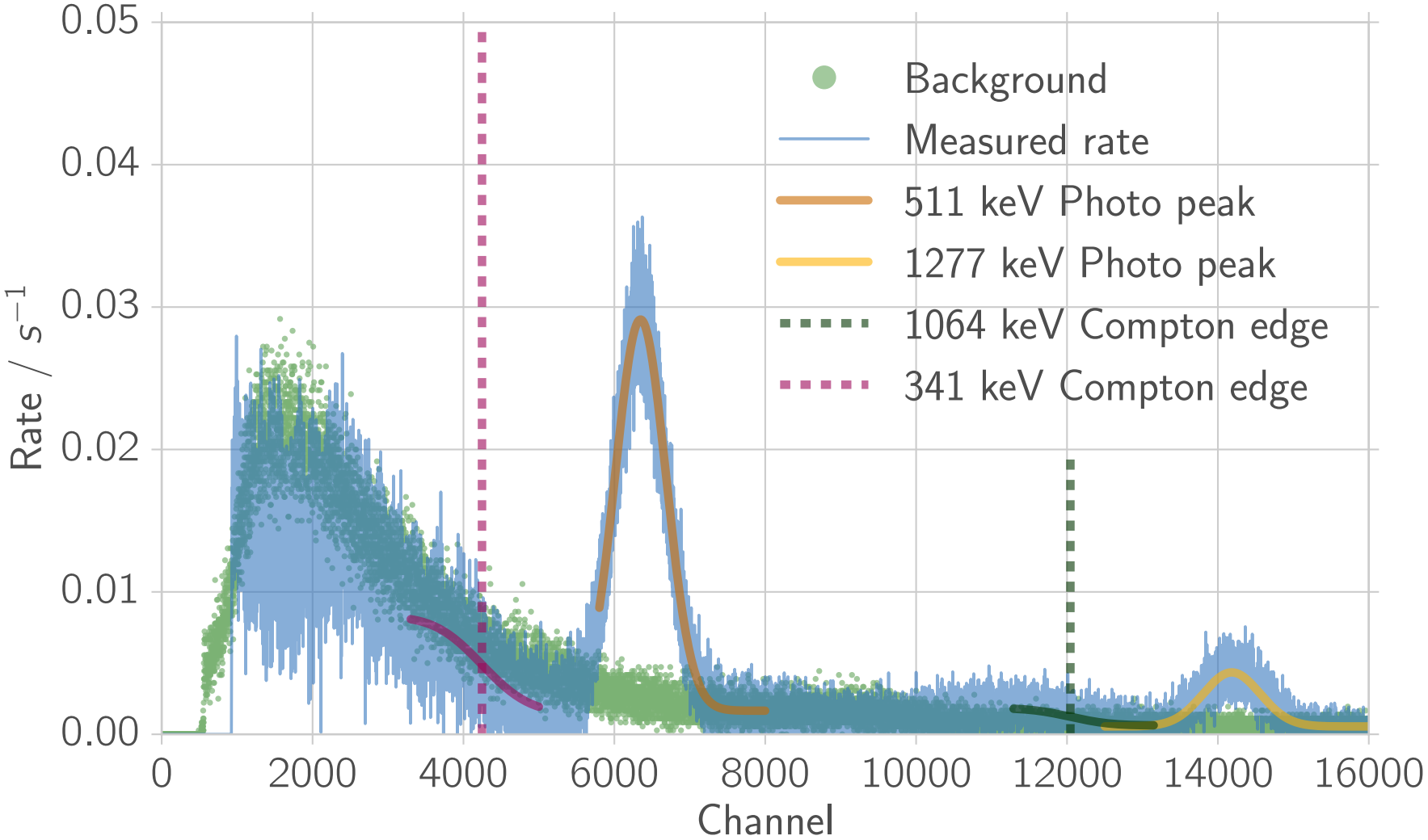
^{137}Cs sample (measurement time 2.7h)



Peaks and fitting results of ^{22}Na

Name	Energy	Channel
1. Photo peak	511 keV	6347 ± 3
2. Photo peak	1277 keV	14180 ± 20
1. Compton edge	341 keV	4000 ± 2000
2. Compton edge	1064 keV	12000 ± 4000

^{22}Na sample (measurement time about 1h)



Linear fit

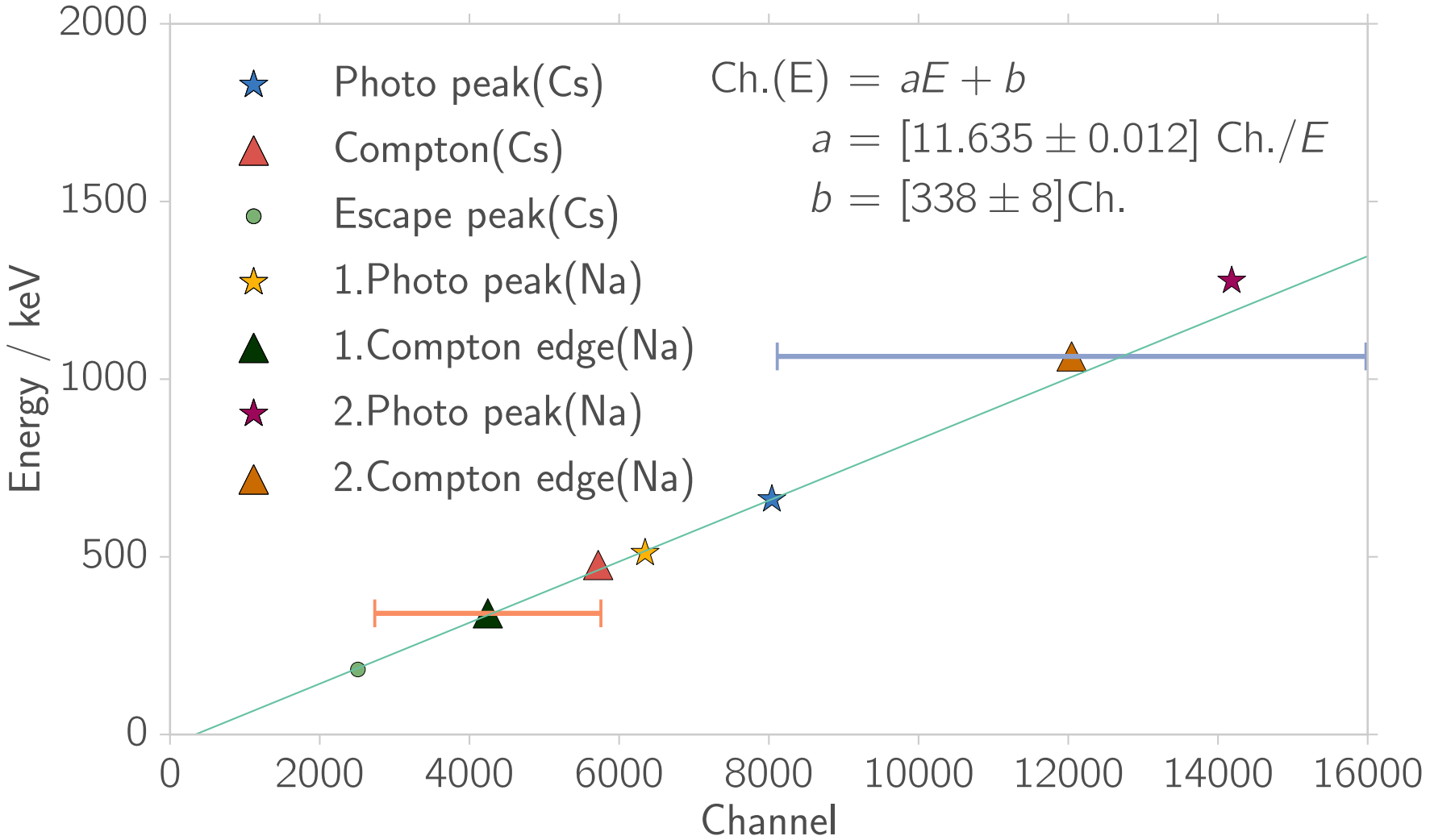


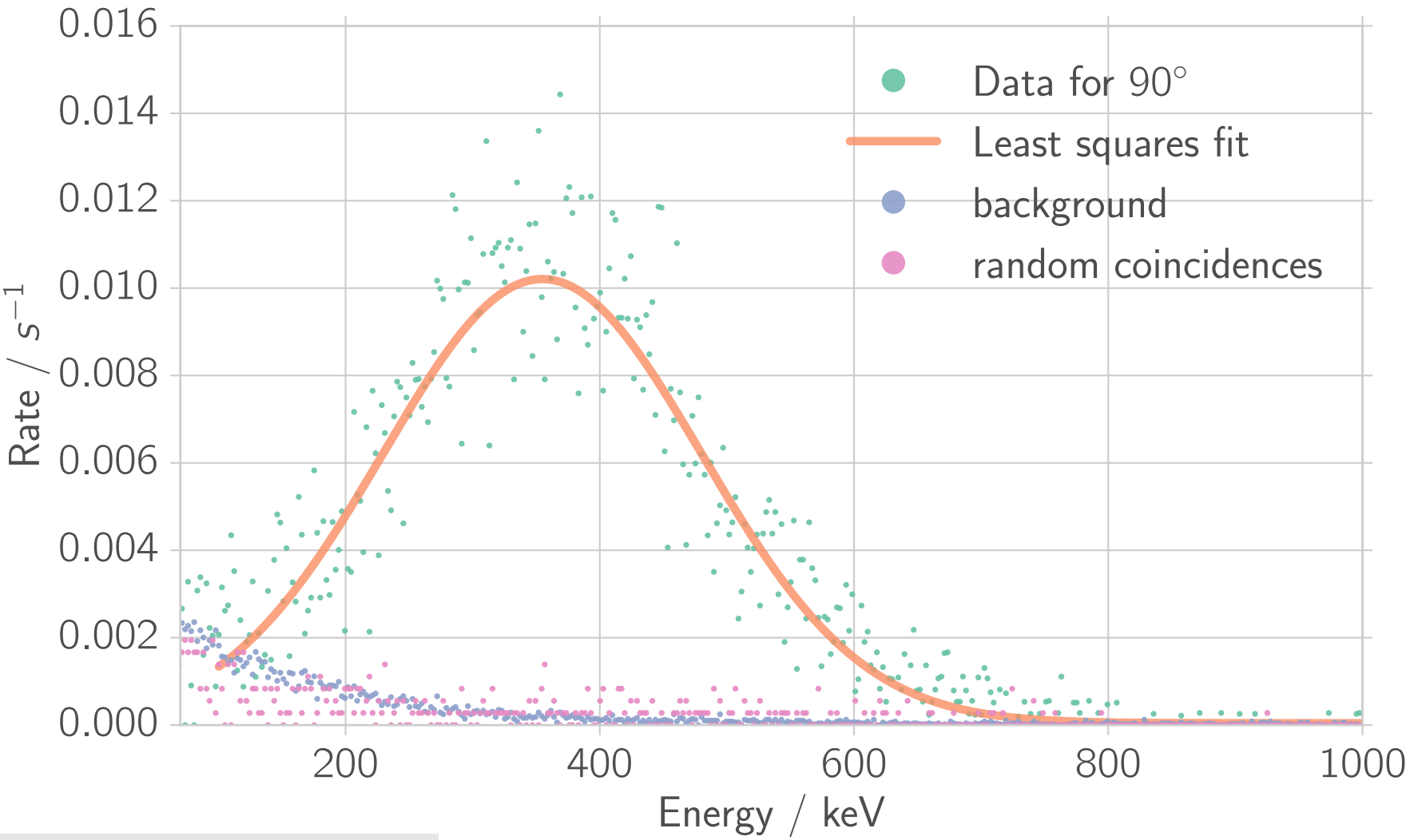
Photo peak(Cs)
Compton(Cs)
Escape peak(Cs)
1.Photo peak(Na)
1.Compton edge(Na)
2.Photo peak(Na)
2.Compton edge(Na)
Ch.(E) = aE + b
a = [11.635 ± 0.012] Ch./E
b = [338 ± 8]Ch.
Energy / keV
Channel
0
500
1000
1500
2000
0
2000
4000
6000
8000
10000
12000
14000
16000

Energy Conservationation

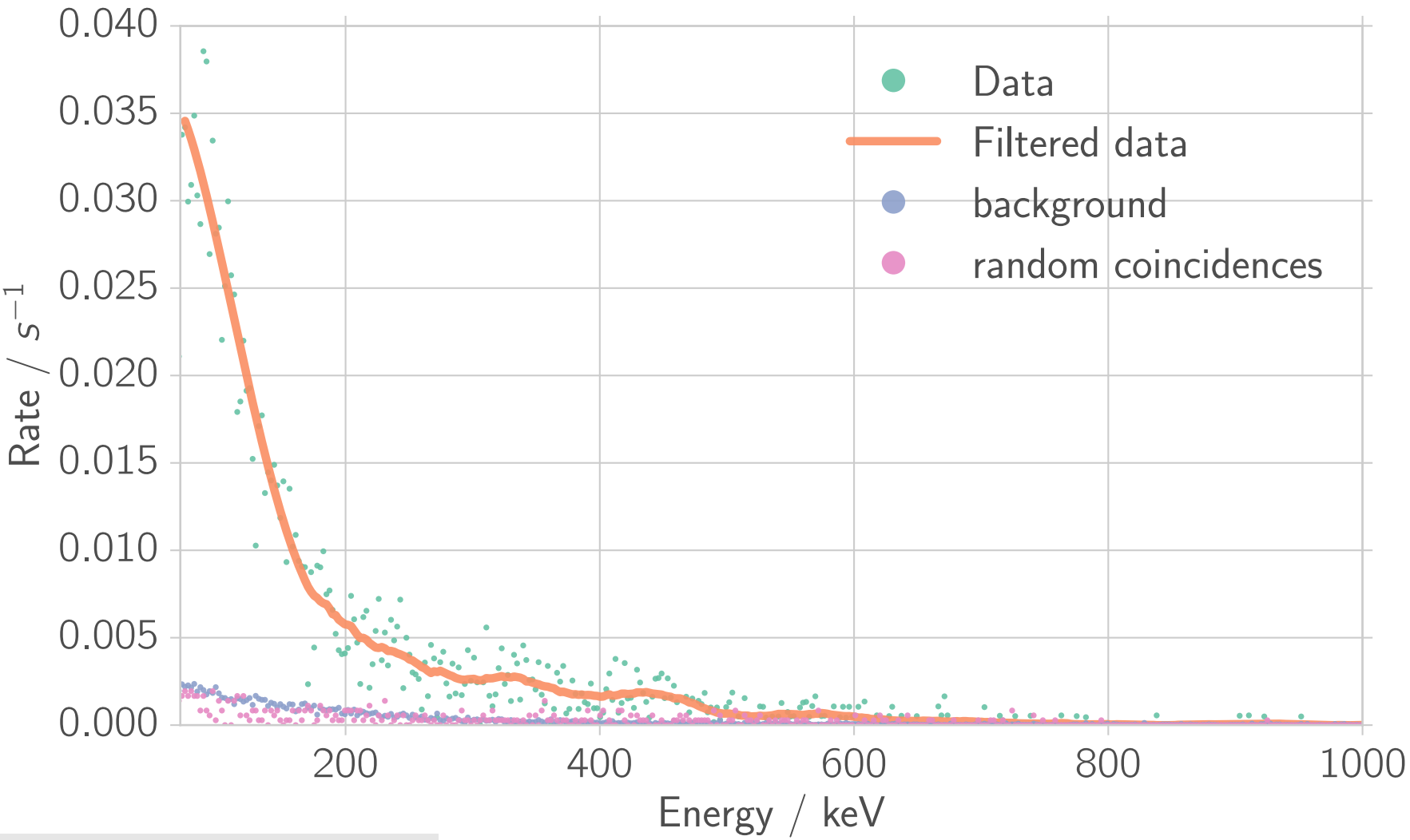
- Comparison of peak energies for different angles

Background of the PS scintillator with coincidence and random coincidences (measurem. time 13.4h and 1h)

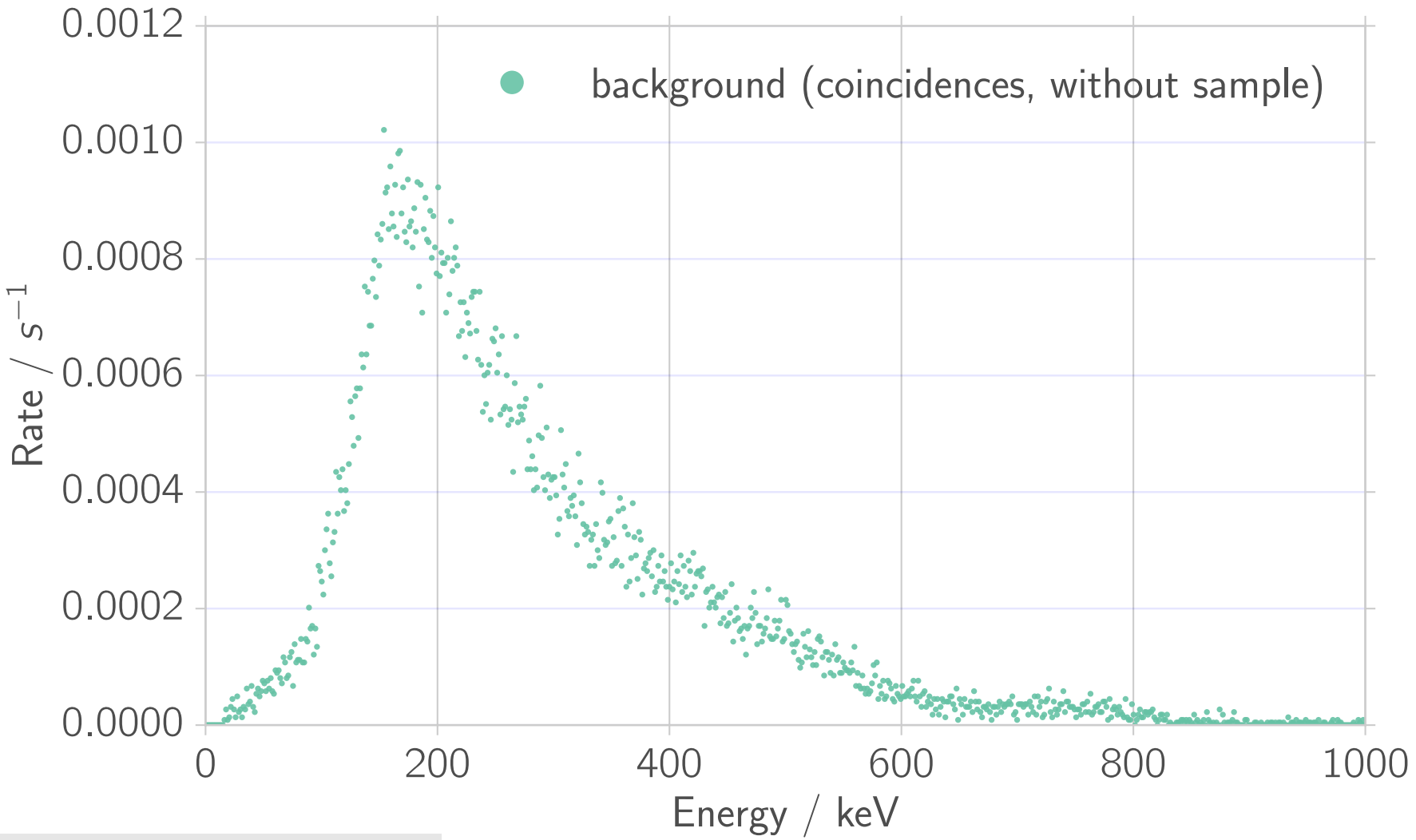
Energy of electrons: Rate of coincident events of PS scintillator at angle of $\theta = 90°$



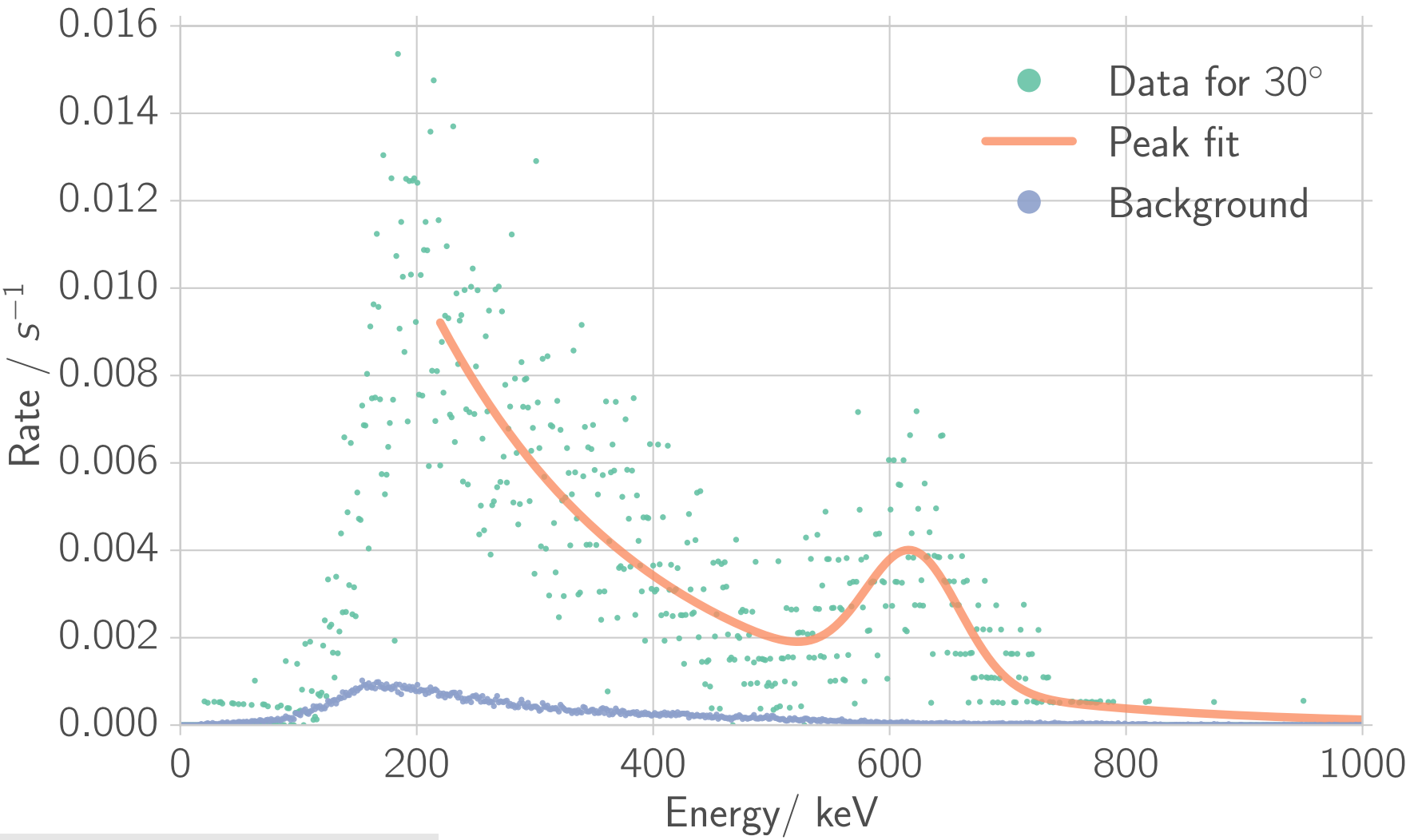
Energy of electrons: Rate of coincident events of PS scintillator at angle of $\theta = 15°$



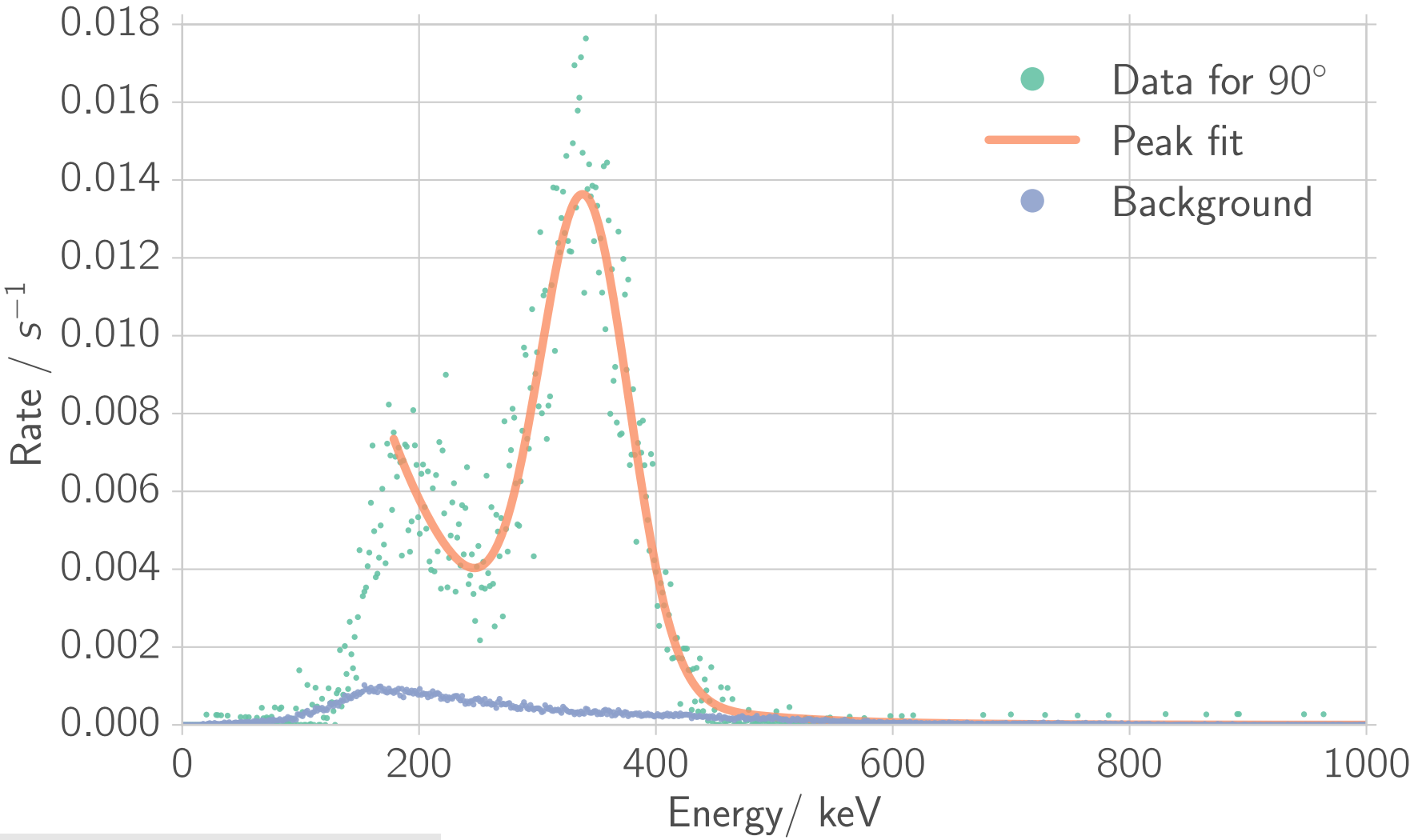
Background of NaI scintillator with coincidences (measurem. time 62h)



Energy of photons: Rate of coincident events of NaI scintillator at angle $\theta = 30°$



Energy of photons: Rate of coincident events of NaI scintillator at angle $\theta = 90°$



Now to the result: combining all those peaks...