

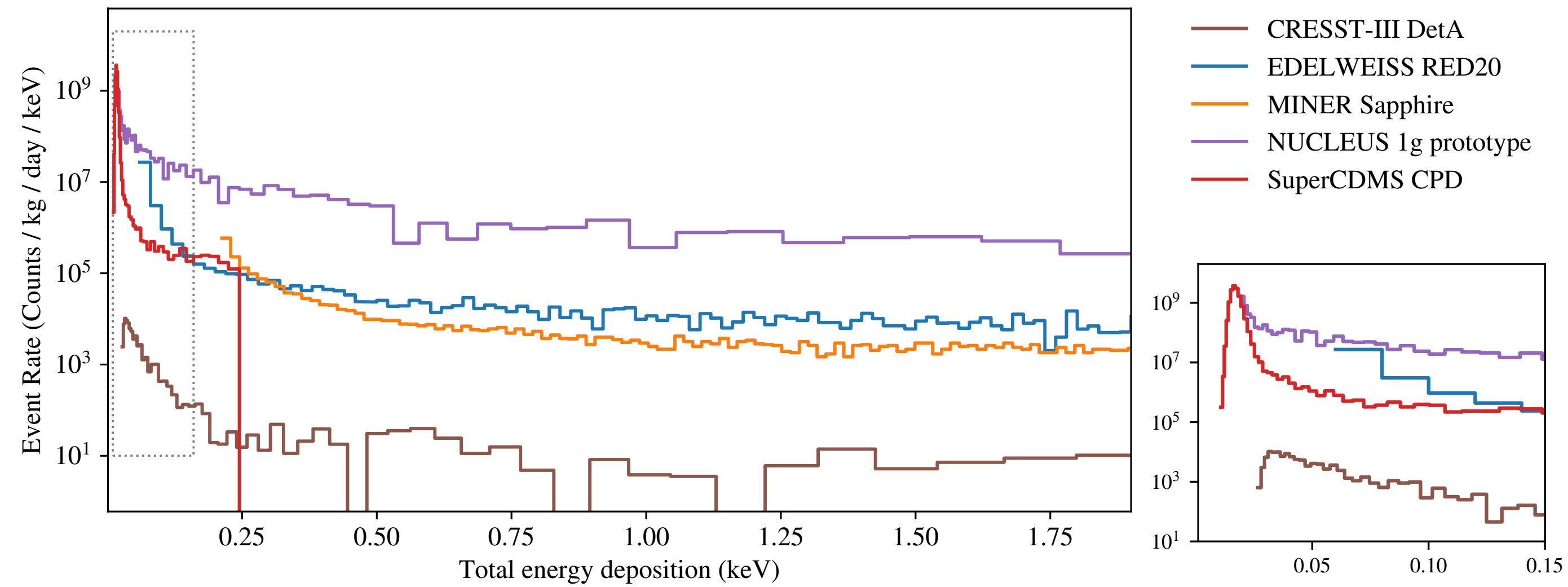


EXCESS 24

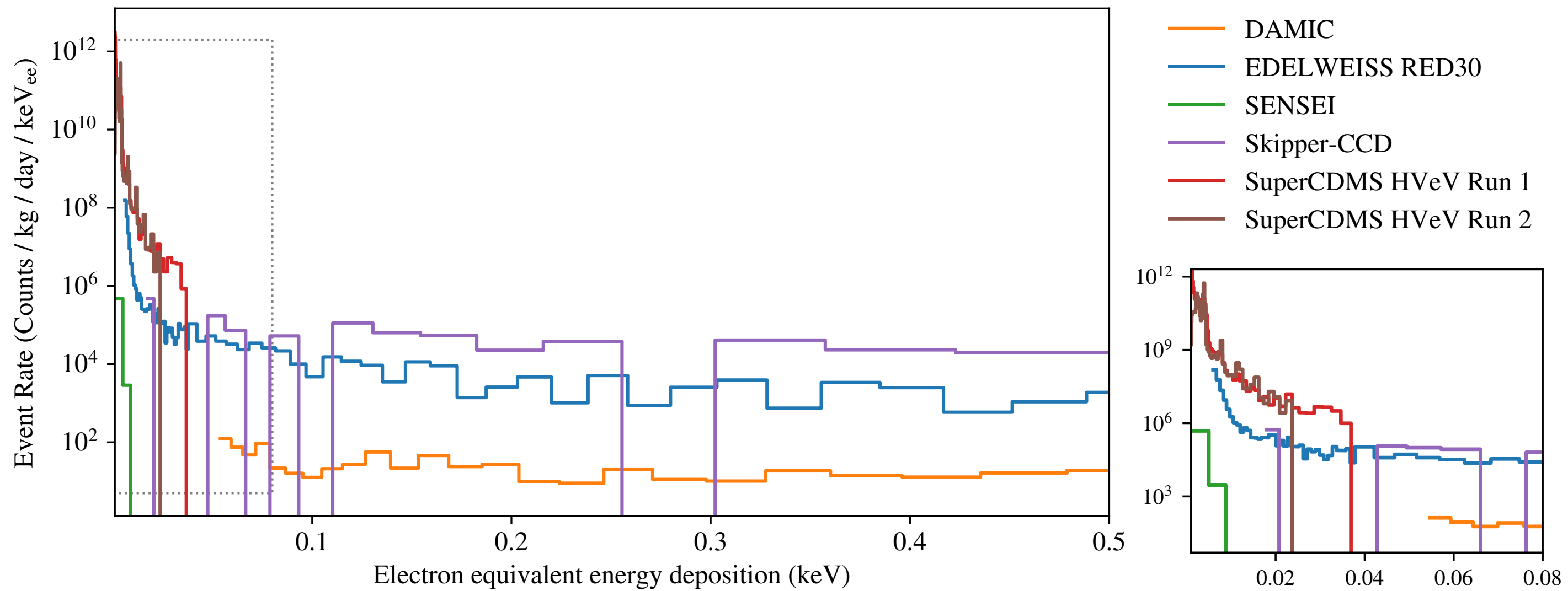
Marco Vignati, July 6, 2024

The observations

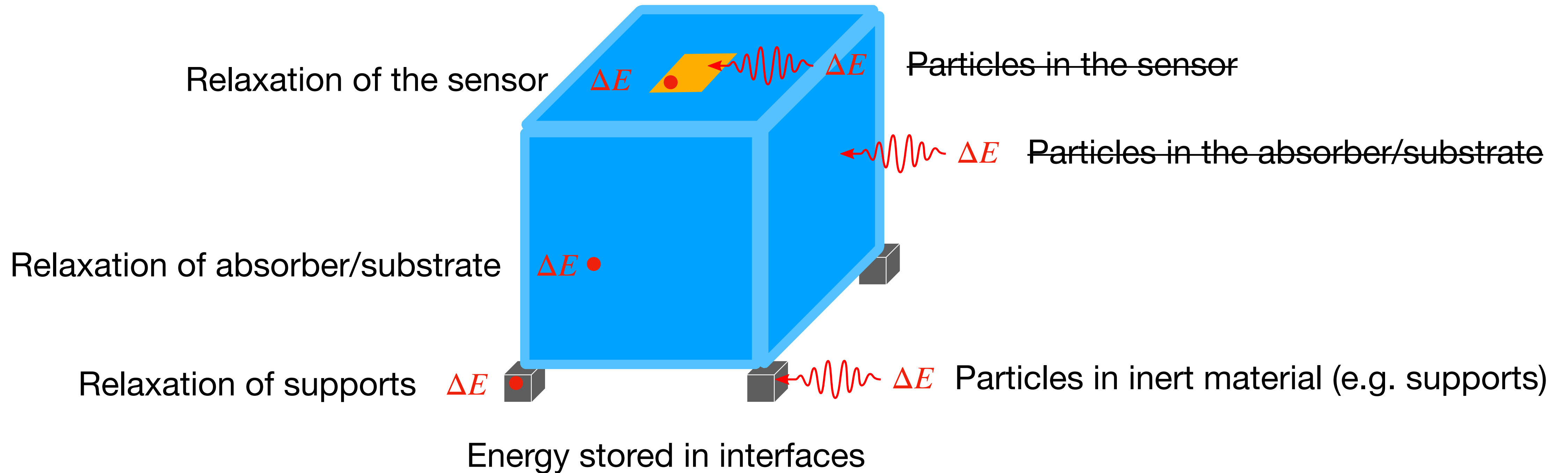
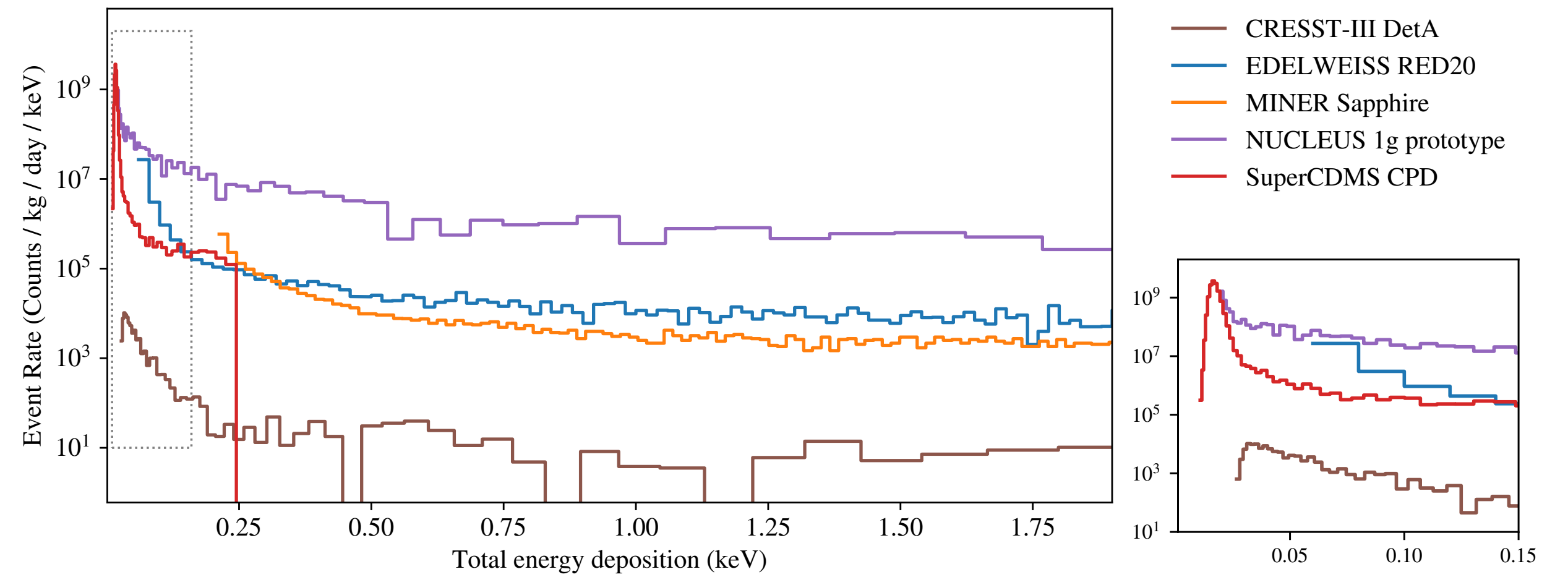
Phonons



Electrons

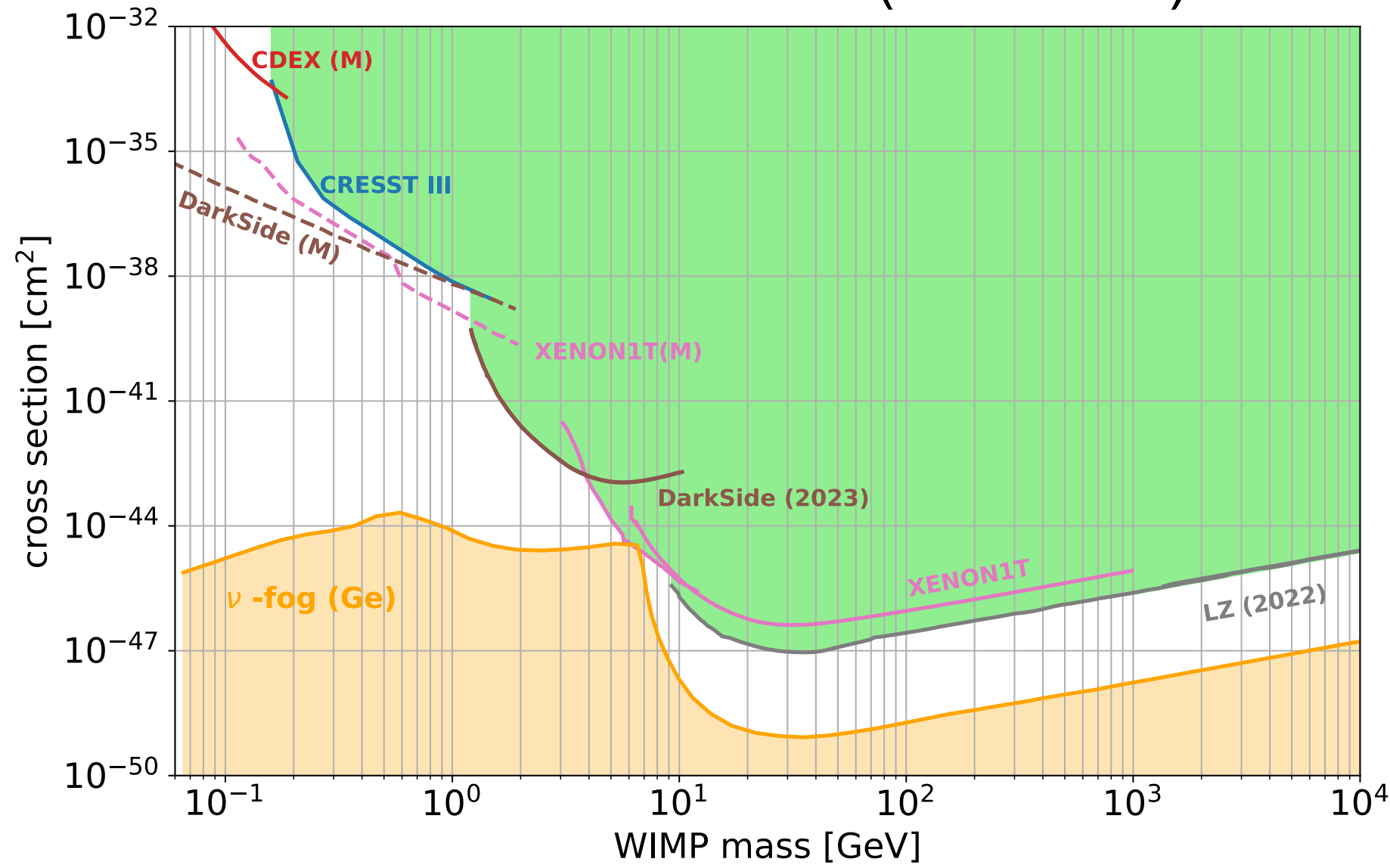


What causes the EXCESS?

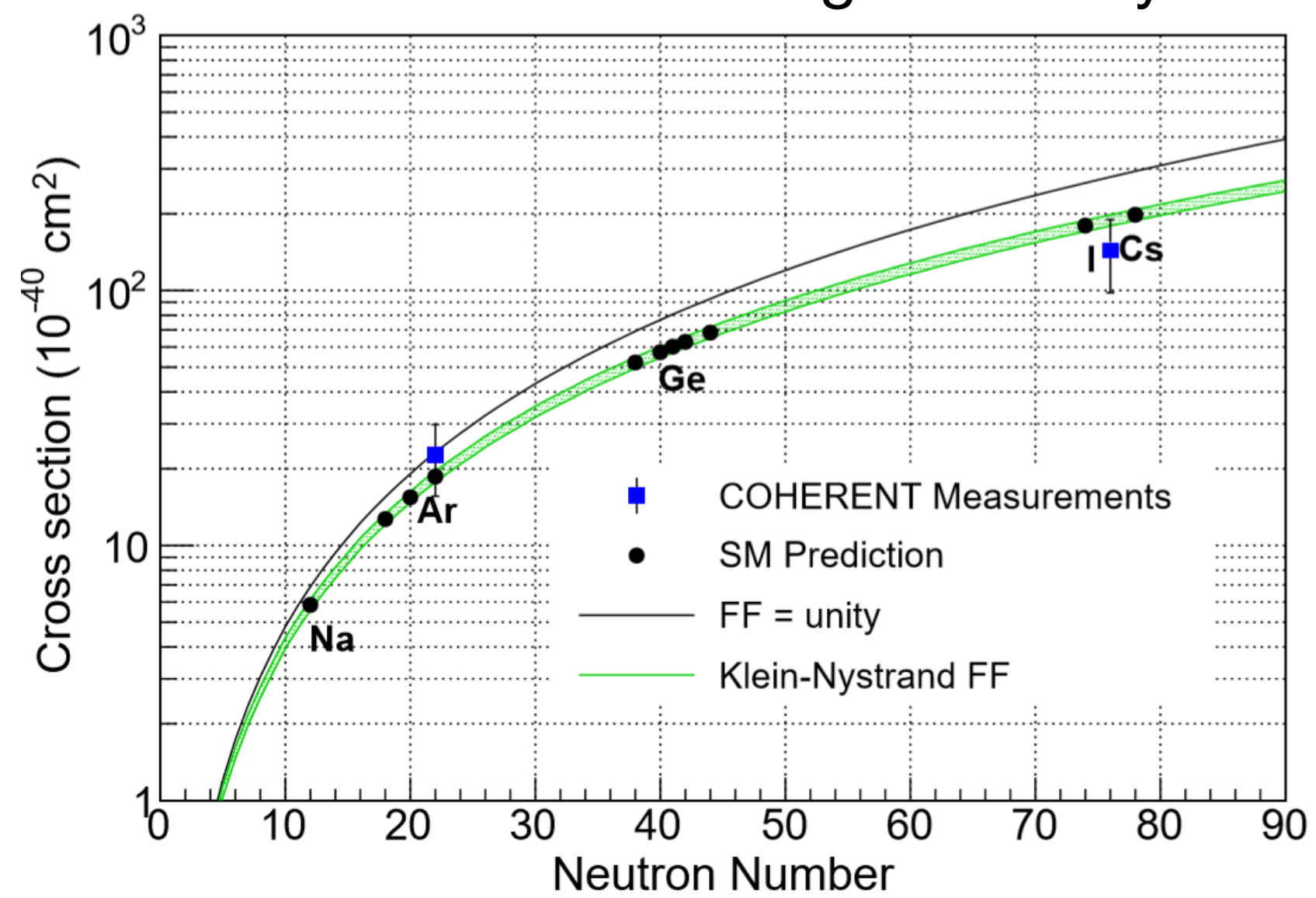


Implications

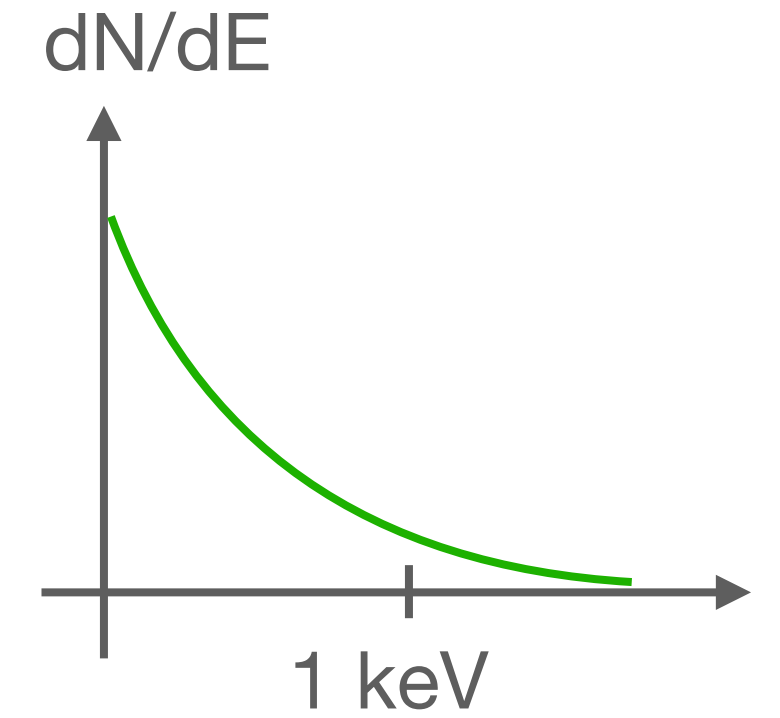
Dark Matter search (low-mass)



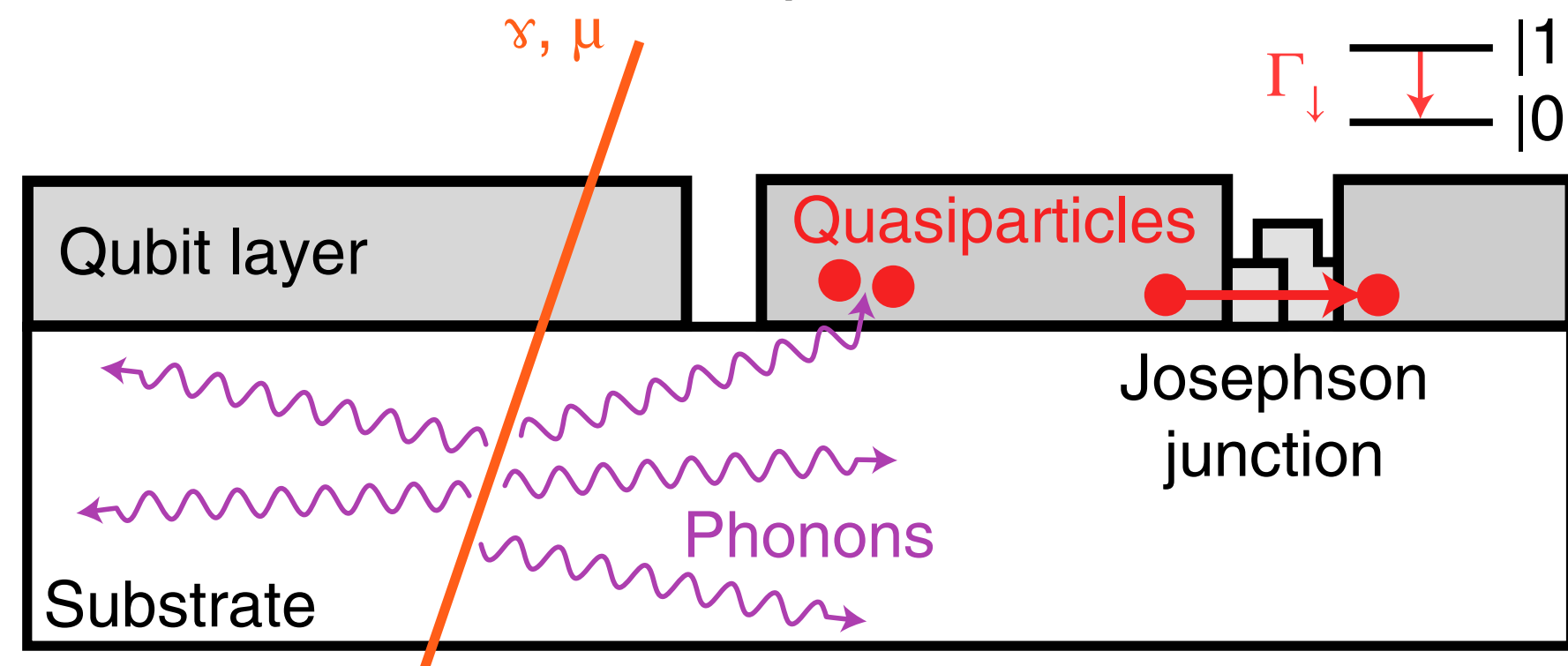
Coherent ν scattering sensitivity



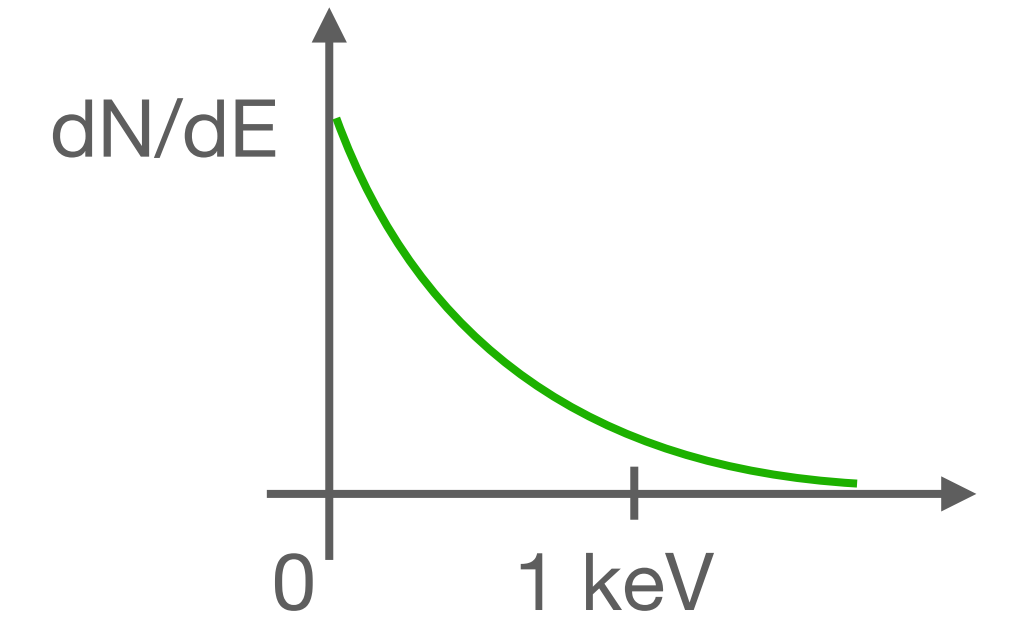
Dark Matter and CEvNS signal similar to Excess background



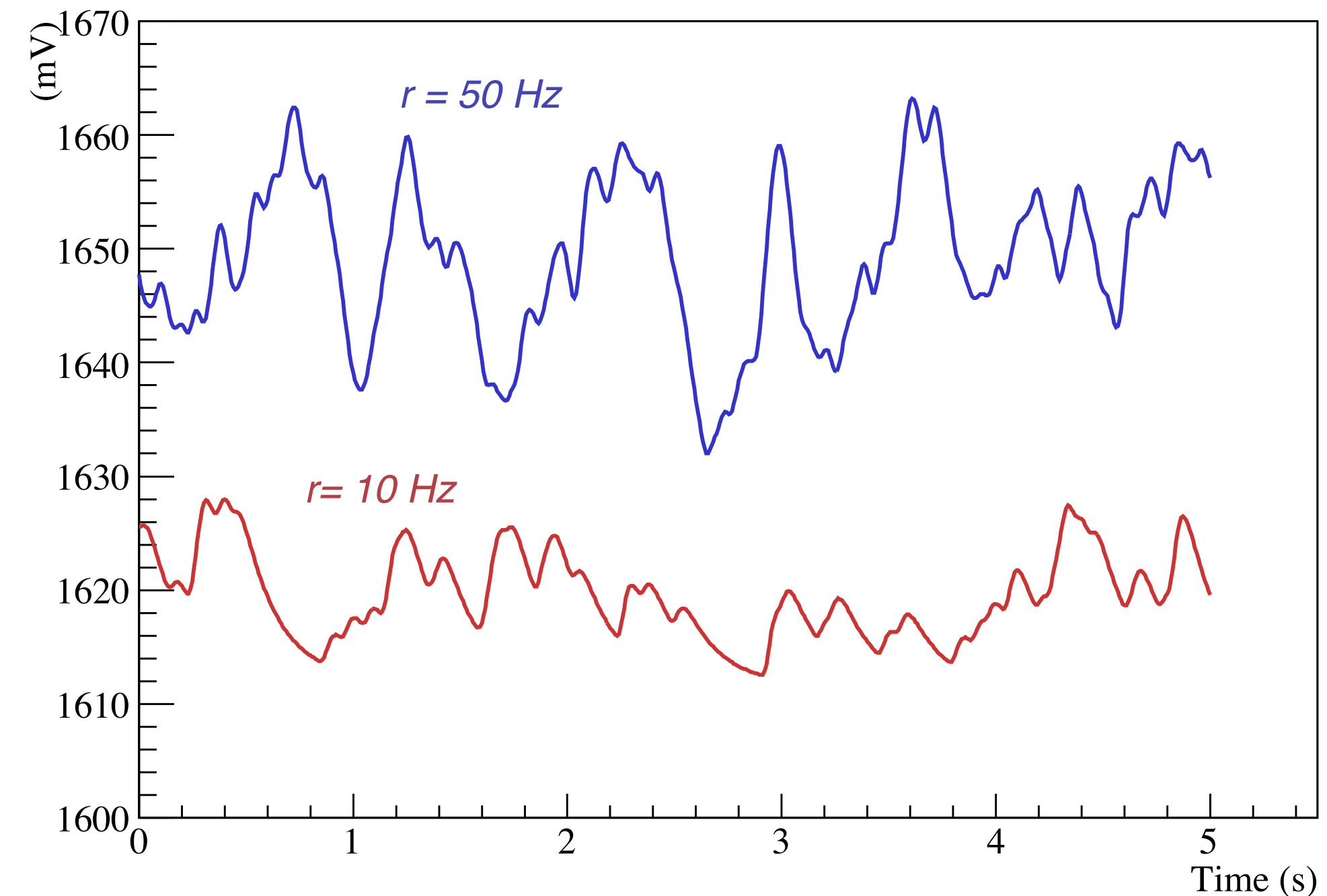
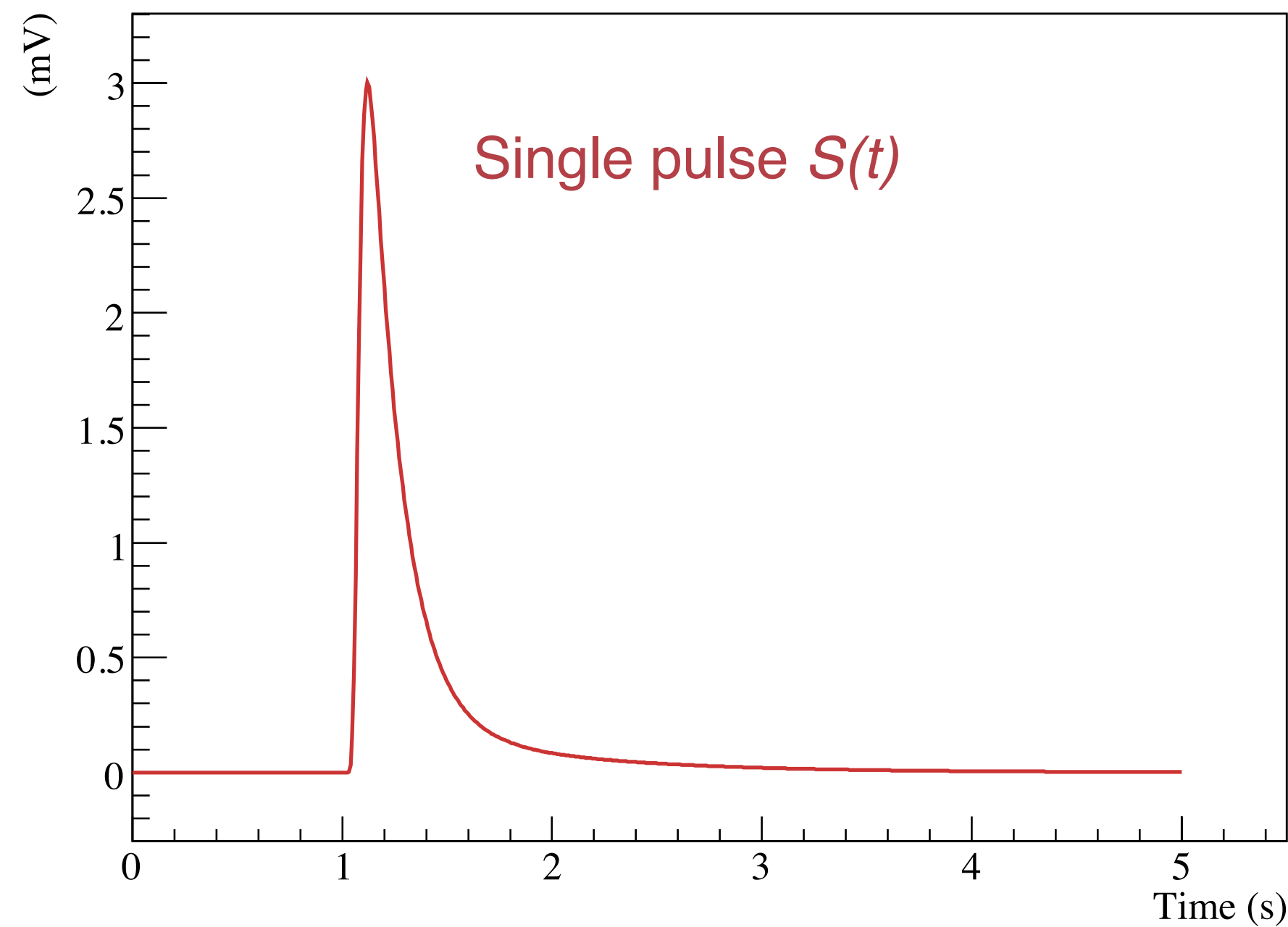
Coherence in quantum circuits



Implications on energy threshold



Exercise: generated Poisson process of amplitude $A = 3$ mV pulses at different rates r on top of a baseline of 1613 mV.

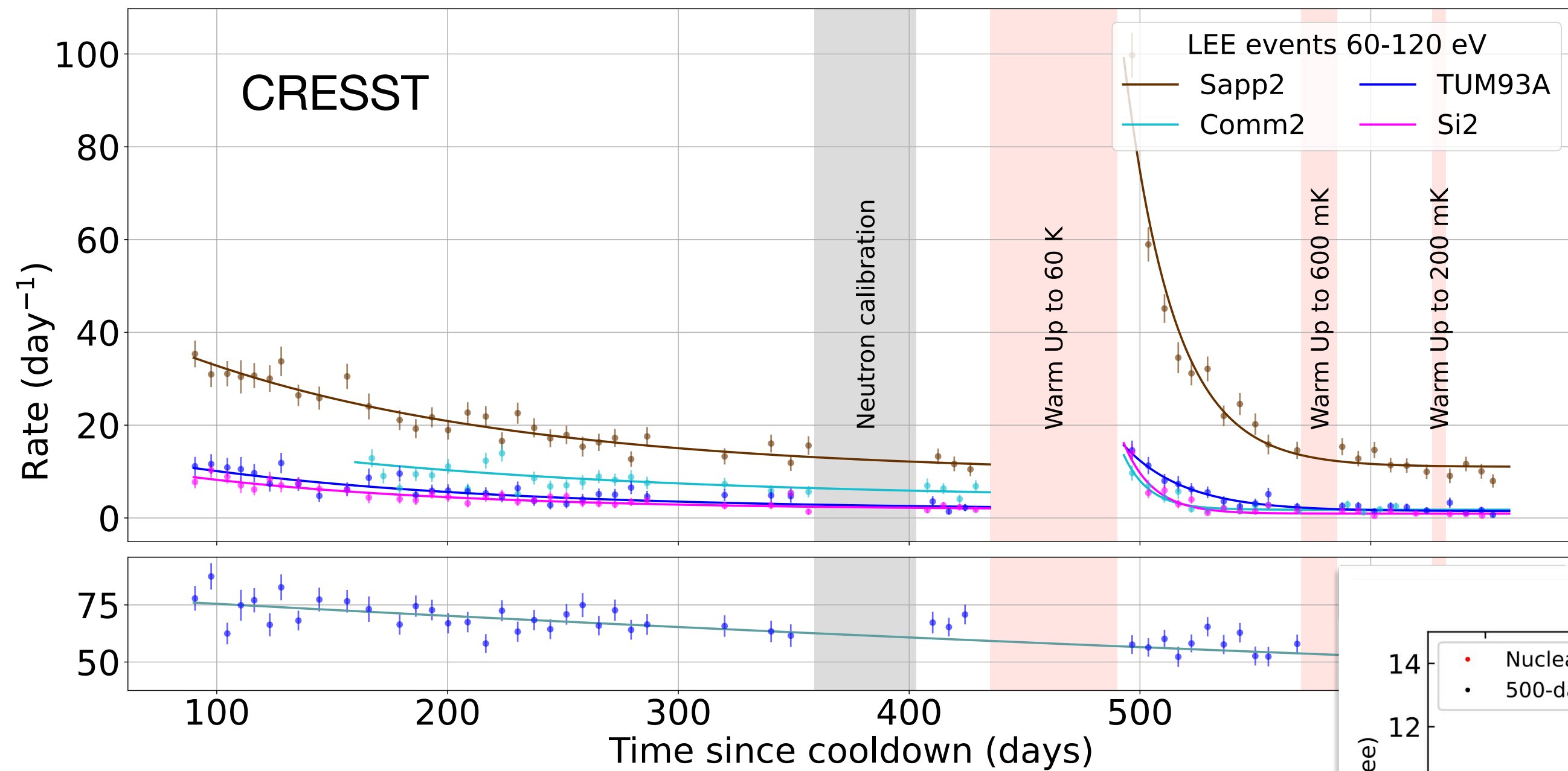


$$\sigma_{N_S}^2 = r A^2 \int_T [S(t) - \bar{S}]^2 dt$$

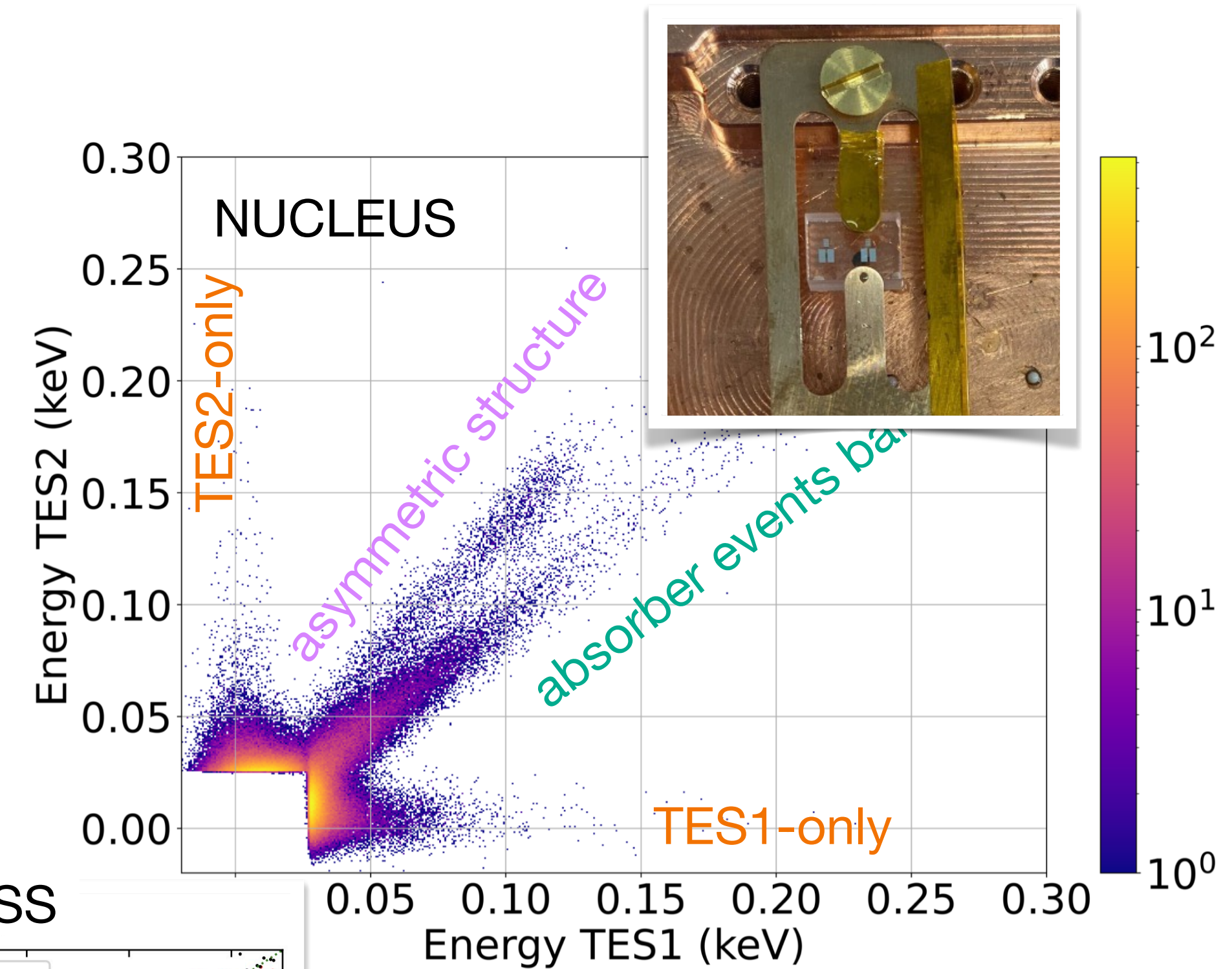
Two-fold consequence: events below threshold add extra noise, extra noise raises the threshold

We do spotted something

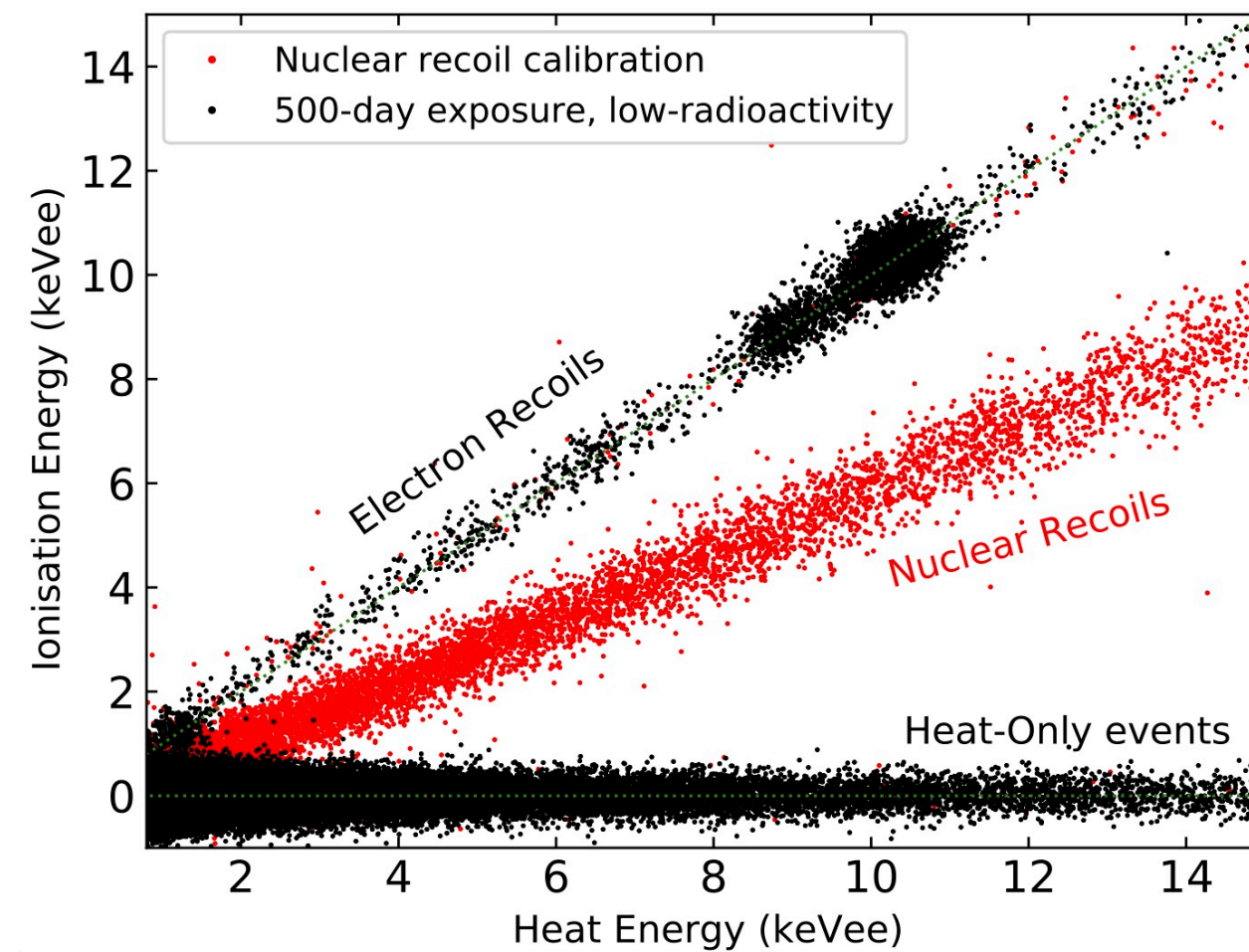
Time dependency rules out particles?



Concurrent readout points to sensors



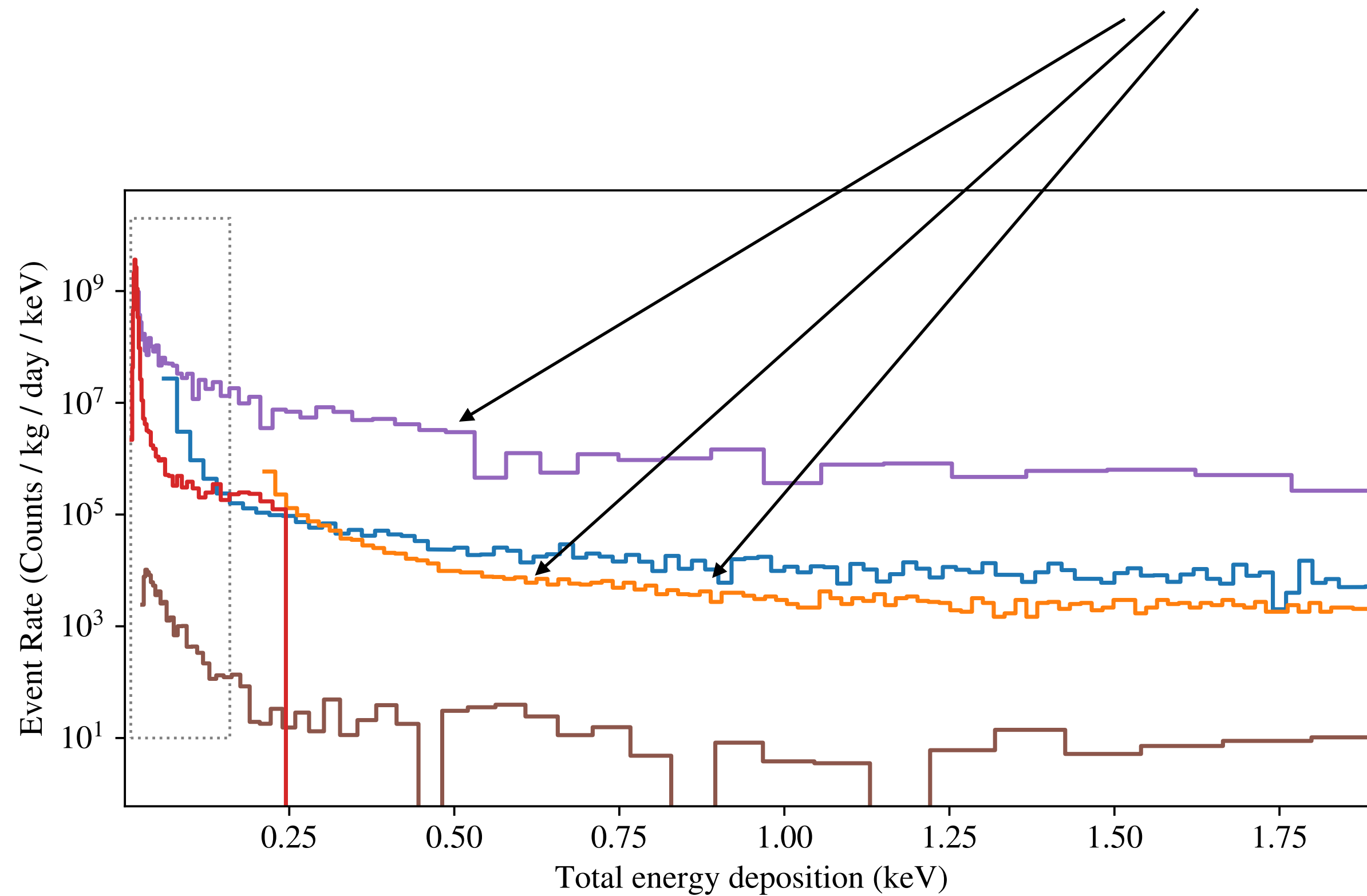
EDELWEISS



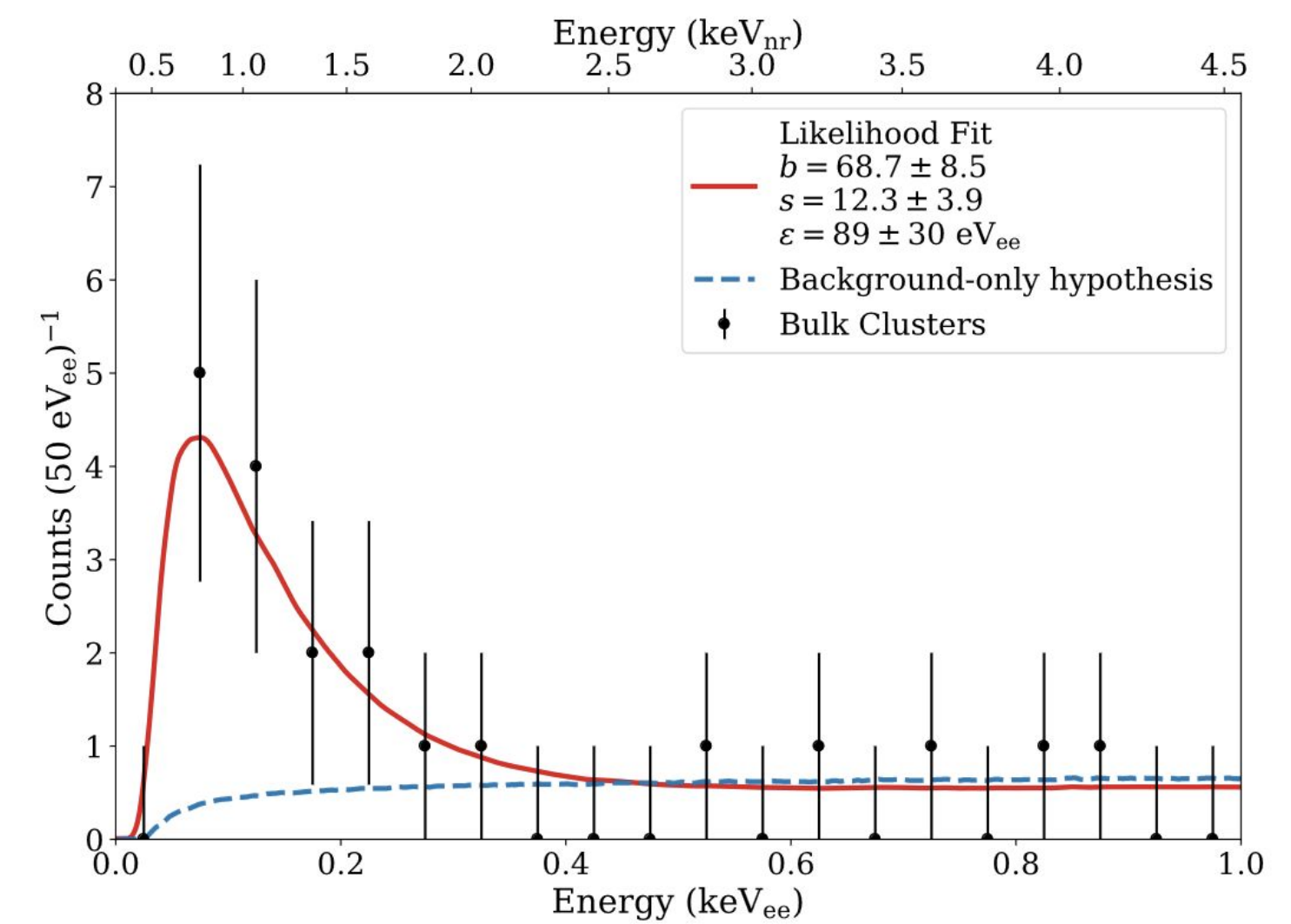
What generates heat-only events?

Multiple origin?

Do our data match the background models above the main excess?



DAMIC-M Data / MC comparison



Today's workshop: morning

Welcome and Introduction	<i>Marco Vignati</i>
<i>Amaldi Room, Physics Department - Edificio Marconi</i>	09:30 - 09:50
DAREDEVIL	<i>Andrea Melchiorre</i>
<i>Amaldi Room, Physics Department - Edificio Marconi</i>	09:50 - 10:10
LEGENDRE: HVeV detectors down at CUTE	<i>Emanuele Michielin</i>
<i>Amaldi Room, Physics Department - Edificio Marconi</i>	10:10 - 10:30
Below threshold analysis in BULLKID	<i>Matteo Folcarelli</i>
<i>Amaldi Room, Physics Department - Edificio Marconi</i>	10:30 - 10:50
Discussion	
<i>Amaldi Room, Physics Department - Edificio Marconi</i>	10:50 - 11:00
Coffee Break	
<i>Amaldi Room, Physics Department - Edificio Marconi</i>	11:00 - 11:30
Heat Only events in Edelweiss and Ricochet Ge detectors: update	<i>Jules Gascon</i>
<i>Amaldi Room, Physics Department - Edificio Marconi</i>	11:30 - 11:50
CRESST-III and the quest of the Low Energy Excess	<i>Michele Mancuso</i>
<i>Amaldi Room, Physics Department - Edificio Marconi</i>	11:50 - 12:10
New excess measurements from NUCLEUS	<i>Margarita Kaznacheeva</i>
<i>Amaldi Room, Physics Department - Edificio Marconi</i>	12:10 - 12:30
Spice	<i>Roger Romani</i>
<i>Amaldi Room, Physics Department - Edificio Marconi</i>	12:30 - 12:50
Discussion	
<i>Amaldi Room, Physics Department - Edificio Marconi</i>	12:50 - 13:00
Lunch	
<i>Amaldi Room, Physics Department - Edificio Marconi</i>	13:00 - 14:00

New: electrons - solid state

New: electrons - solid state

phonons

phonons

phonons

phonons

phonons

Today's workshop: afternoon

Energy release from recrystallization of amorphous pockets and low-energy excess signals <i>Amaldi Room, Physics Department - Edificio Marconi</i>	<i>Kai Nordlund</i> 14:00 - 14:20
A source of excess quasiparticles in superconducting aluminum that decays over time <i>Amaldi Room, Physics Department - Edificio Marconi</i>	<i>Elsa Mannila</i> 14:20 - 14:40
Investigating Infrared-Induced Excess Quasi-Particles in Superconducting Qubits <i>Amaldi Room, Physics Department - Edificio Marconi</i>	<i>Michael Kerschbaum</i> 14:40 - 15:00
Phonon-only quasiparticle poisoning in superconducting qubits <i>Amaldi Room, Physics Department - Edificio Marconi</i>	<i>Eric Yelton</i> 15:00 - 15:20
Discussion <i>Amaldi Room, Physics Department - Edificio Marconi</i>	15:20 - 15:30
Poster and Coffee <i>Amaldi Room, Physics Department - Edificio Marconi</i>	15:30 - 16:00
SENSEI update on single-electron events <i>Amaldi Room, Physics Department - Edificio Marconi</i>	<i>Ana Martina Botti</i> 16:00 - 16:20
Low energy ionization signals in DarkSide <i>Amaldi Room, Physics Department - Edificio Marconi</i>	<i>Sandro De Cecco</i> 16:20 - 16:40
Discussion <i>Amaldi Room, Physics Department - Edificio Marconi</i>	16:40 - 18:10

superconductor

superconductor

superconductor

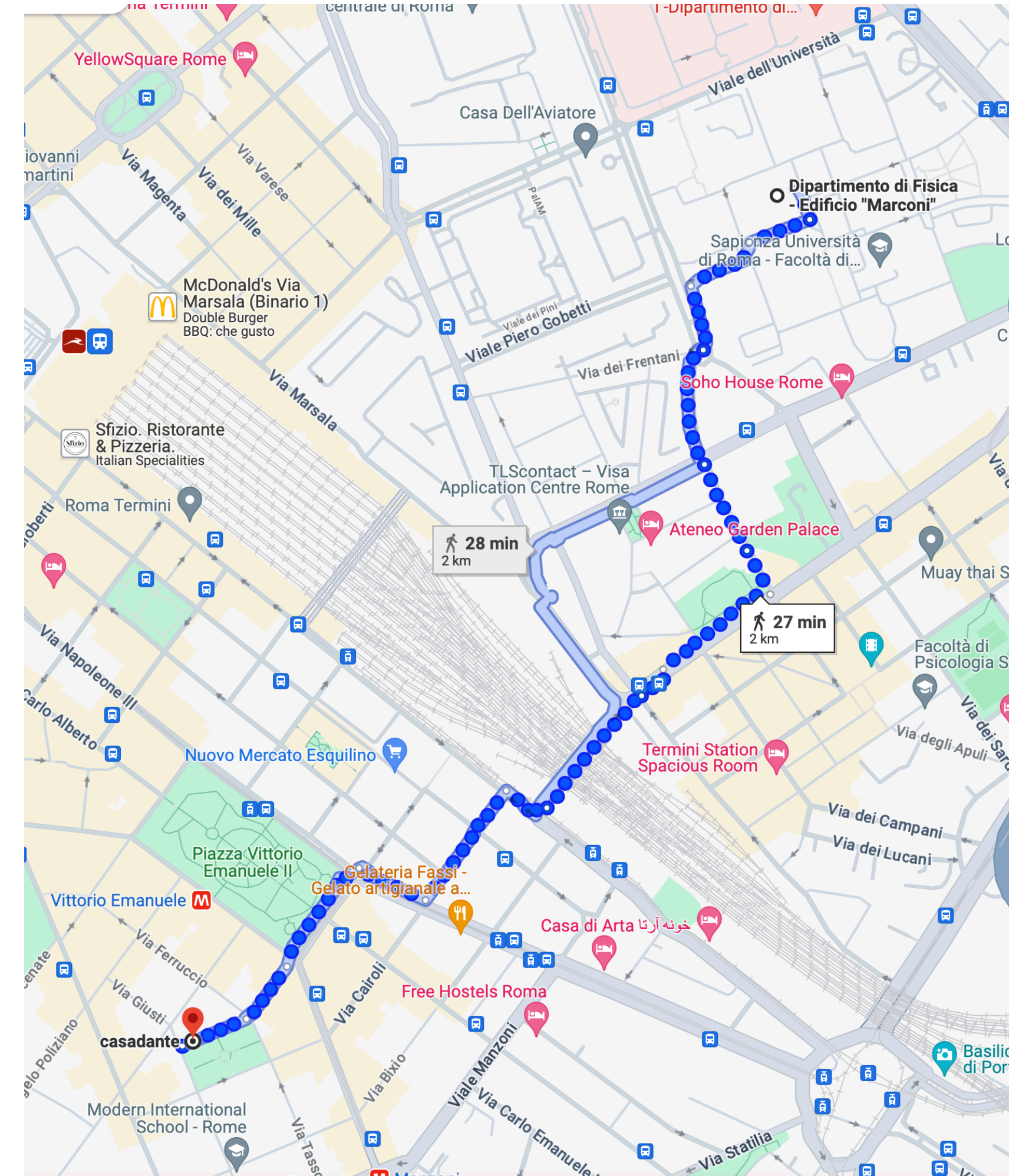
electrons - solid state

electrons - liquid/gas

Today's workshop: evening

Bar "Casa Dante", Piazza Dante, 8

<https://maps.app.goo.gl/93ooiFnnV6FYejQ9>



Meet you there at 19:00

Reference person: Laura

