

Unbound states in $^{19}\text{O}(\text{d},\text{p})^{20}\text{O}$

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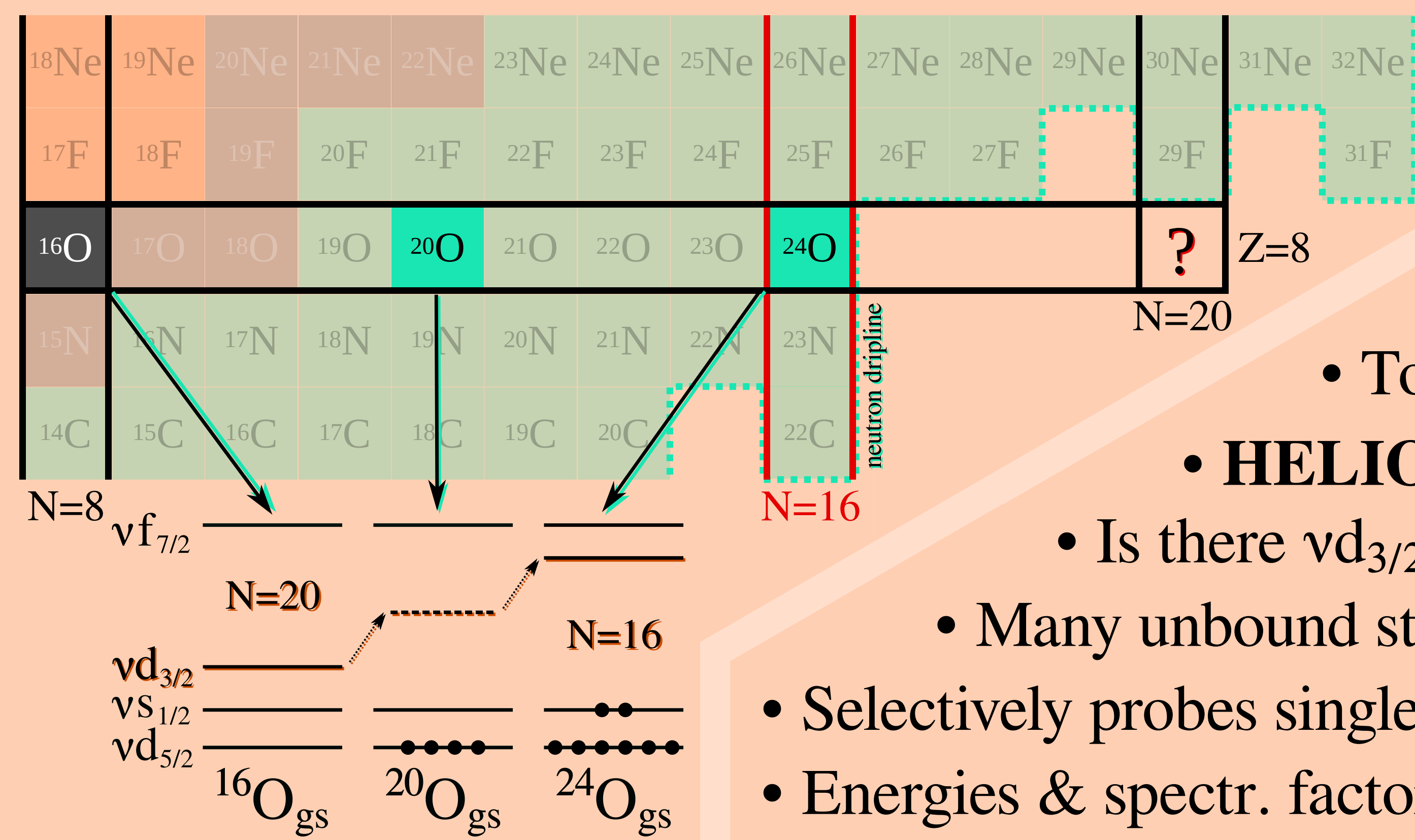


MOTIVATION

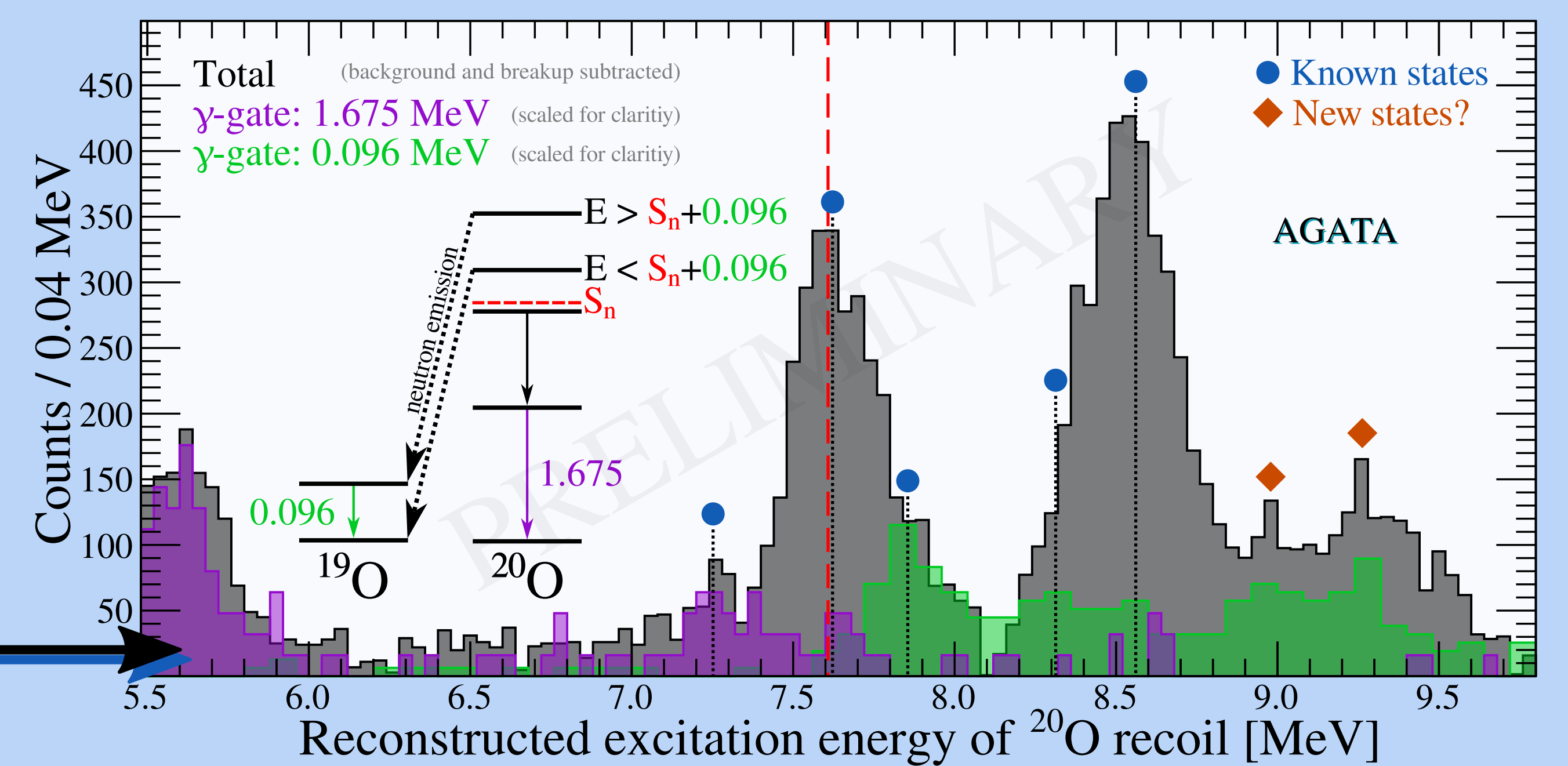
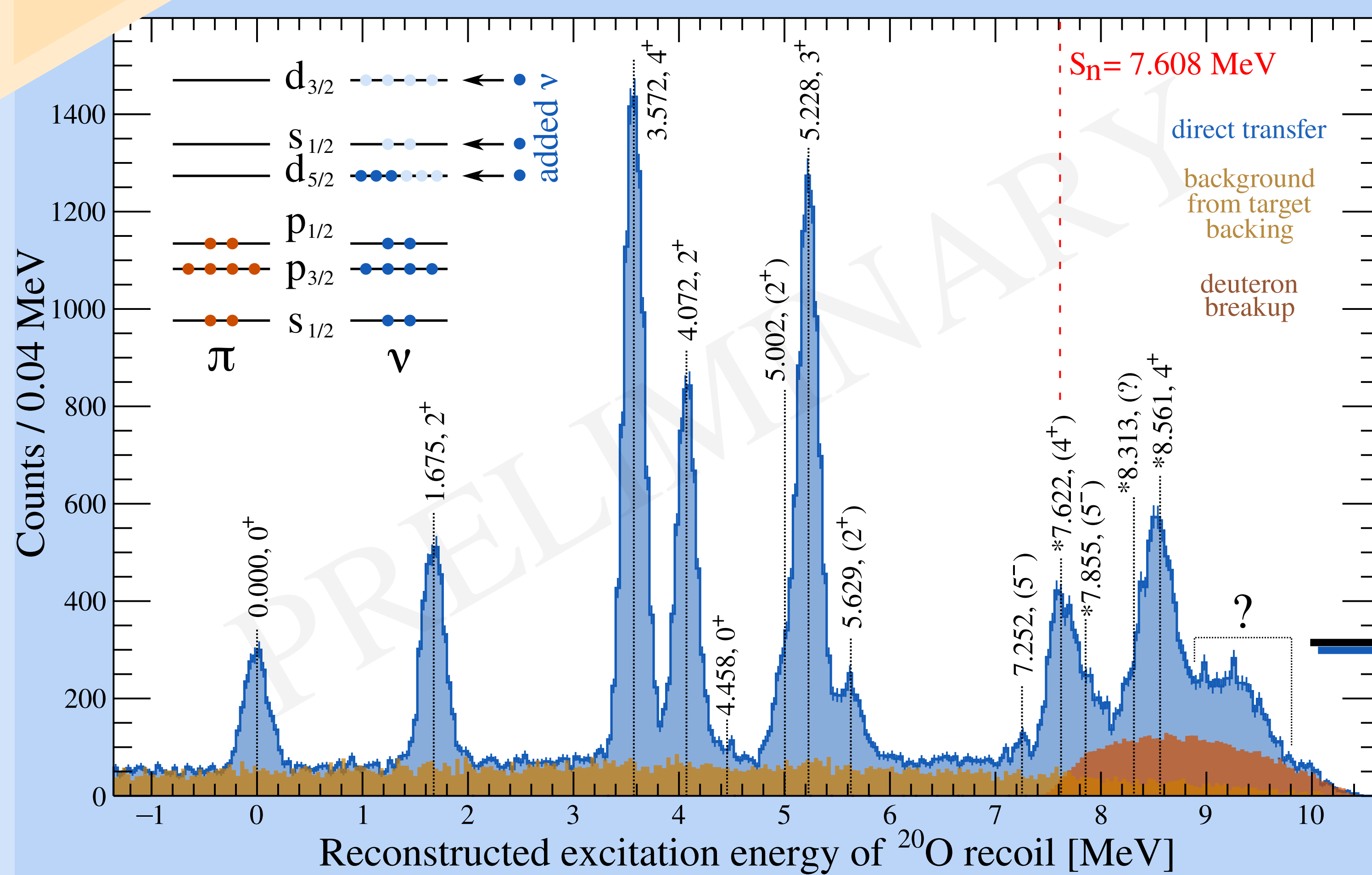
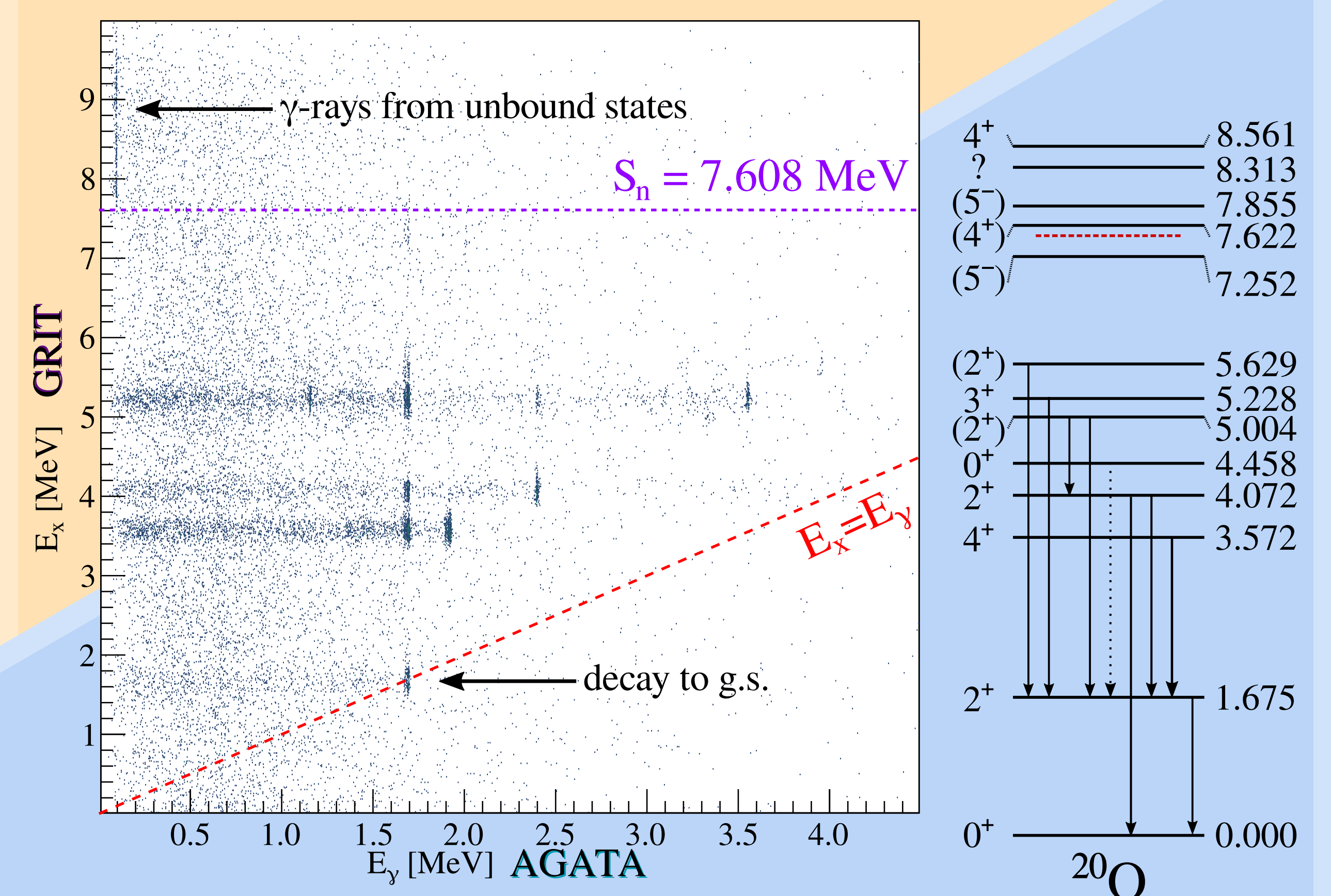
METHOD

PRELIM. RESULTS

REF

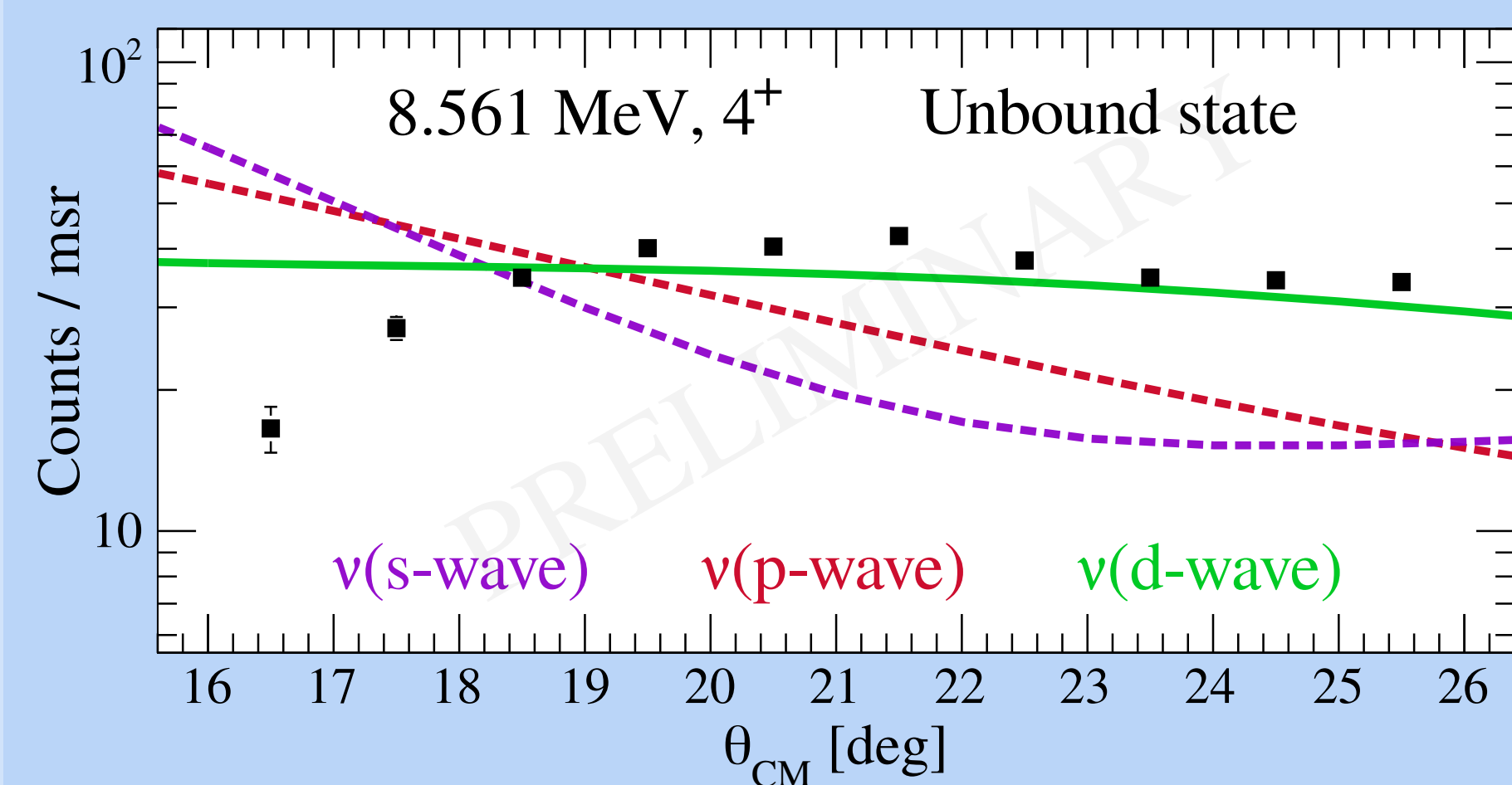
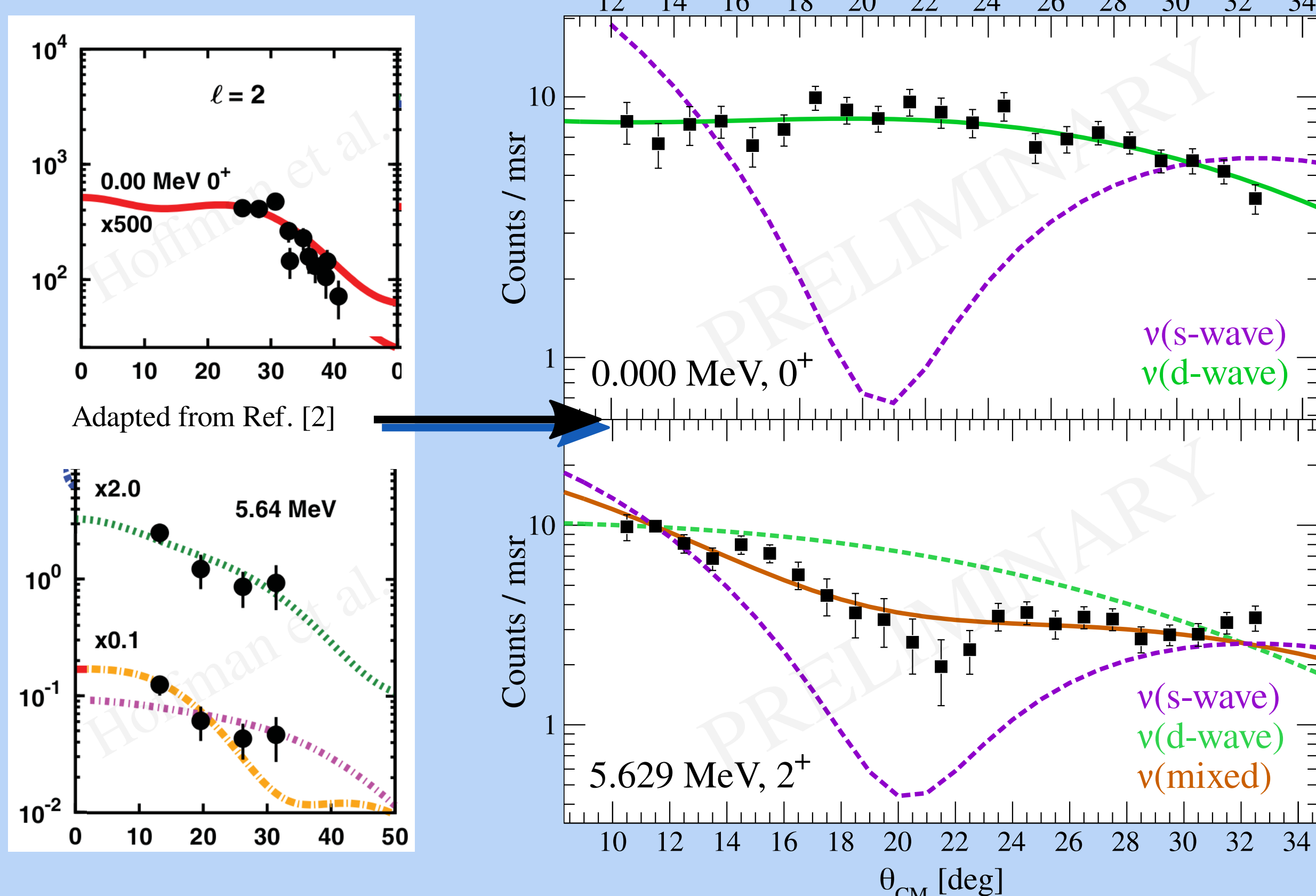


- Oxygen dripline anomaly at "doubly-magic" ^{28}O !
- Due to **shell evolution** from drifting $\text{vd}_{3/2}$ orbital [1].
- Need to **pin down** $\text{vd}_{3/2}$ moving away from stability.
- Hence, study of ^{20}O , between doubly-magic ^{16}O & ^{24}O .
- To study neutron structure, perform single- ν direct transfer.
- **HELIOS: Bound states** in ^{20}O are $\nu(\text{d}_{5/2}, \text{s}_{1/2})$, but no $\text{vd}_{3/2}$ [2].
- Is there $\text{vd}_{3/2}$ strength at higher energies? $\rightarrow$ **study unbound states!**
- Many unbound states known, but never studied by single-particle transfer.
- Selectively probes single-part. struct. via overlap of initial and final wavefunction.
- Energies & spectr. factors of single particle states $\rightarrow$ **energy of ν -orbital!**



- First observation of unbound states by (d,p) transfer
- **Selectivity and separation** due to γ -ray coincidences

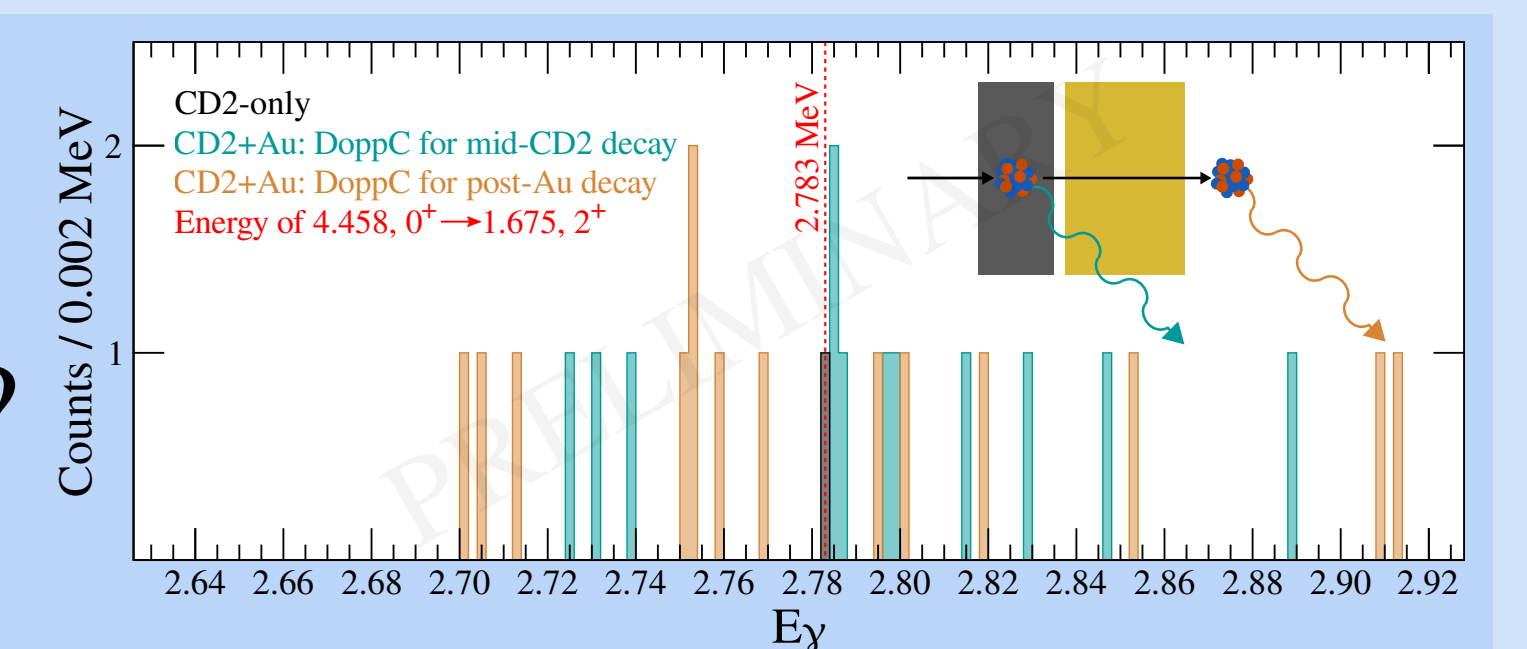
Improved bound state differential cross sections



- **Unbound distribution**
- DWUCK4 Vinc.&Fort.
- Possibly d-wave! $\text{d}_{3/2}$?
- **Next steps:**
- Other unbound states
- Is $\text{d}_{5/2}$ fully depleted?

Details of 6p-2h intruder?

- 4.458 MeV, 0^+ is 6p-2h [3]
- $S < 0.2$ in [2], can we improve?
- With γ -decay, can we limit τ ?



Interested? Next **GRIT+AGATA+VAMOS** campaign in 2029!

- [1] T. Otsuka *et al.* Phys. Rev. Lett. **87**, 082502 (2001)
 [2] C. R. Hoffman *et al.* Phys. Rev. C **85**, 054318 (2012)
 [3] S. LaFrance *et al.* J. Phys. G. **5**, L59 (1979)

This work is a particle-focused reanalysis of:
 I. Zanon, PhD Thesis, Univ. of Ferrara (2021)
 I. Zanon *et al.* Phys. Rev. Lett. **131**, 262501 (2023)

