

Dated, falsifiable predictions for heavy-baryon spectroscopy and dark matter: $\Xi_{cc}^* = 3659$ MeV, $\Omega_b^* = 6067$ MeV, $B_0^*/B_1' = 5665$ MeV, $H_{cc} = 4497$ MeV, and knot dark matter at 1.7–2.2 GeV
(pre-registration, TQNT — v3, state as of 4 September 2026, before measurement)

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Purpose. This document freezes, *before measurement*, the dated quantitative predictions of TQNT-V6 (Topological Quantum Knot Theory, 6th edition), with their values, windows and *refutation conditions*. It is intended for a timestamped deposit (DOI) separate from the monograph, so that the future confrontation is accountable: any prediction listed here that is missed within its window counts *against* the theory, with no requalification possible. The values come from the TQNT-V6 monograph (version of 2026-07-27) and its scripts; none will be modified after deposit (any revision will go through a *new* dated version, the old one remaining accountable).

Declared antecedent. One prediction of the same programme is already *confirmed*: $\Omega_{cc} \sim 3727$ MeV (LHCb, 06/2026) within the predicted range $[3715, 3788]$ MeV. Honest chronology: the announcement preceded the final consolidation of the scale (a blind derivation in practice, not a formal preregistration) — hence precisely this document for what follows.

1 Hadronic spectroscopy (LHC, Run 3+)

Prediction	TQNT value	Refuted if
Ξ_{cc}^* ($J=3/2$ partner)	3 659 MeV	measured $\sim 3\,690$ (lattice/QM)
Ω_b^*	6 067 MeV (+22 vs Ω_b)	outside $\pm$ a few MeV
$\Omega_b(1P, j=0, J=\frac{1}{2})$ (the 5 th of the quartet)	6 297–6 304 MeV	absence or outside window
B_0^*/B_1' (bottom $j_K=1/2$ doublet)	centroid 5 665 MeV (members $\sim 5\,660/5\,666$, split 6.6 MeV)	5 591 or 5 517 (the $-\frac{1}{2}/-1$ readings); $\sim 5\,700$ – $5\,750$ (other models)
$\Sigma_b(1P)$ quintet	$j_0\,6\,076; j_1\,6\,092/6\,102;$ $j_2\,6\,111/6\,128$ MeV	j_0/j_2 levels absent in $\Lambda_b\pi$
$\Sigma_c(1P)$ triplet	2 772/2 821/2 869 MeV ($\pm$ a few MeV)	outside windows
$\Xi_b'(1P, j=0)$	$\sim 6\,243$ MeV	— ($\Xi_b(6227)$ reservation declared)
Bottom 1D doublet	5 903/5 972 MeV (gap ~ 69)	$B_J(5970) \neq 1D$ top ($J^P \neq 3^-$)
Ω_{ccc}	4 782 MeV (strict)	clear deviation
Ω_{bbb}	<i>outside the framework</i> (negative binding expected)	standard bound state found
H_{cc}^{++} (ground state 0^+)	$4\,497 \pm 10$ MeV, BOUND ($c\tau \sim 30\,\mu\text{m}$); channels $\Lambda_c^+ p K^- \pi^+$, $\Lambda_c^+ \Lambda \pi^+$	no displaced-vertex signal in the listed channels
H_{cc} excited 1^+	$4\,572 \pm 10$ (pinned to the $\Lambda_c \Lambda_c$ threshold)	any peak $> 4\,573$ MeV refutes
H_{bb}^0 (0^+)	$11\,212 \pm 10$ MeV, bound ($c\tau \sim 220\,\mu\text{m}$)	—
Light H (dibaryon $uuddss$)	ABSENT (2 481, +250 above threshold)	any detection
Strange-baryon orbital bands	offset $s = 0.358(2) + \text{full dilution}$	$s = 0.376$ ($\Delta W_r/3$)
$\Delta(2950)$ ($J^P=\frac{15}{2}^+$, 2-star) — added 2026-08-04	true mass $\sim 2\,850$ MeV (inverse-Regge reading: $\frac{15}{2}$ exact at 2 849; PDG value from old analyses $2\,950 \pm 100$)	mass confirmed at $2\,950 \pm 30$ with $J^P=\frac{15}{2}^+$ in modern partial-wave analyses (+7% slope required on the Δ trajectory alone)
$j_K=3/2$ splitting	$\kappa = 0.0650\,\text{GeV}^2$ universal ($\times 0.813$ strange)	non-universality
Z/H	exact degeneracy of the mirror doublets	any splitting (= CP-odd EW signature)

2 Families, neutrinos, weak currents

Prediction	Refuted if
Never a 4th family (derived Z_3 saturation)	any 4 th generation
No sterile neutrino, at any mass	any confirmation (MicroBooNE, DUNE, KATRIN...)
$0\nu\beta\beta$: rate = 0 exactly (Dirac neutrinos)	any $0\nu\beta\beta$ signal
$\Sigma m_\nu \approx 66$ meV	very different cosmological value
Charged-current saturation: $\text{BR}_{\text{lep}}/\text{mode} \geq \sim 8\%$	clear violation

3 Dark matter

Prediction	Refuted if
Absence in standard direct detection (> 5 GeV, LZ/XENONnT)	standard WIMP detection
Absence also at 1.7–2.2 GeV (DS-20k, XLZD): $\sigma_{\text{eq}} \sim 10^{-48} \text{ cm}^2$	any detection in this window
6 narrow γ lines at 1.07/1.10/1.22/1.35/1.47/1.64 GeV (~ 1 dex below the 2015 limits; deep Fermi-LAT target)	smeared continuum at these energies (= tension); absence at $\times 10$ sensitivities
No BH post-merger regenerated DM (P22 WKB)	residual post-merger signal

4 Cosmology and gravitation

Prediction	Refuted if
$\Omega_{\text{tot}} = 1$ exact (flatness theorem)	any confirmed curvature
$w = -1$ constant ($dw/dz = 0$ by construction)	$w(z)$ confirmed (the DESI preference must <i>regress</i>)
H_0 and S_8 tensions: must regress (systematics/local void in GR)	new physics confirmed
Large-scale CMB anomalies: no cross-replication (E modes, lensing, 21 cm)	any cross-replication
Standard sirens at low $z \rightarrow$ global H_0	local amplification confirmed
Metrology of G : convergence downwards ($G_{\text{predicted}} = 6.6710 \times 10^{-11}$)	consolidation at 6.674 (refutes at 5×10^{-4})
No GRB dispersion ($E_{\text{QG}} > 9.3 E_P$ protected)	dispersion detected
No drift of the constants (c, α : integer lock $k=135$)	confirmed drift
$r \leq 0.01$ (Starobinsky)	large r measured (LiteBIRD)
No primordial anti-helium (co-localized mirror pairs, universal CP crumb — W-2, $v3$ addition)	any confirmed primordial anti-He (AMS-02 candidates)

5 Forward p–O at the LHC (LHCf, 07/2025 data *not yet published*) — v2 addition, 2026-09-03

The July 2025 p–O run reproduces the first interaction of an air shower; the LHCf *forward* spectra are unpublished at the date of this deposit. Source chain (zero fitted number): leading charge-exchange rate *derived*, $q = (2 - \sqrt{2})/(2(3 - \sqrt{2})) = 0.1847$ (capture-window partition $\times$ sterile $Q = \pm 2$ sense; declared conditional, same rank as the α_{cond} closed form); exchanged slot 3:1 vector (half-turn carried by the reconnection); per-contact compounding over the $\bar{\nu}$ wounded nucleons (declared identification: one wounded nucleon = one P15 contact of the leading line); $P_n(\bar{\nu}) = \frac{1}{2} [1 - (1 - 2q)^{\bar{\nu}}]$, $\bar{\nu} = 2.7 \pm 0.4$ (Glauber, declared input). *Variables*: P_n = probability that the outgoing leading baryon is a neutron (full phase space; in pp, a single contact: $P_n = q$); $k_n = 2E_n/\sqrt{s}$ = neutron elasticity (beam energy fraction carried, LHCf's variable); $\langle 1 - k_n \rangle$ = mean inelasticity. Checks *already passed* (2026-09-03): ZEUS ep (extrapolated full rate $[0.15, 0.20]$ vs $q = 0.185$); ISR ($\langle x_F \rangle_n = 0.26 < \langle x_F \rangle_p = 0.44$, hardness corollary); NA61 π -C (Δ_{ρ^0} predicted 8.2% vs measured 7.7%).

Prediction	TQNT value	Refuted if
$P_n(\text{pp, full phase space})$: probability that the leading baryon is a neutron	0.185 (closed form)	outside [0.14, 0.23]
$P_n(\text{p-O})$: per-contact compounding	0.36 ± 0.03	outside [0.30, 0.42]
Ratio $P_n(\text{p-O})/P_n(\text{pp})$ (acceptances cancel)	1.9 ± 0.15	≈ 1 (no compounding) or outside [1.6, 2.2]
Neutron softening: $\langle 1 - k_n \rangle(\text{p-O})$	> 0.60 firm (naive compounding ~ 0.85); vs 0.536 measured in pp	≤ 0.536 (no softening)
Forward photon energy fraction	<i>reduced</i> vs pre-2025 generators (3:1 vector exchanged slot)	consistent with pre-2025 generators
<i>Neutral</i> leading system: doubled exchange rate	0.369 (both ΔL_k senses open)	charged/neutral equality
Forward final state	no exotics (desert + Vassiliev)	any new particle

Version note. v1 (2026-08-04) had not been deposited; the present deposit is this document's first DOI. The v1 timestamp rests on the public git history of the software repository (commit **b2da8c8**, 2026-08-04); its content is carried over *unchanged*. The p-O predictions above precede any LHCf p-O publication.

6 Internal laboratory test — the B8 null test (v3 addition, 2026-09-04)

A rare case: the depositor pre-registers a *null* result on his own device. Protocol B8 (CA9 internal): quantum dots etched as a trefoil 3_1 ($\varnothing 200$ nm) vs a rectangle (100×100 nm) on the *same* ^{28}Si wafer, same T_2 (spin) coherence-time measurement protocol. The original B8 prediction (gain $e^3 \approx 20$ by “topological resonance”, $N_{\text{eff}} = 9n$) is **abandoned by the depositor**: the electron's knot lives at 0.35 fm, the etching at 200 nm — twelve orders apart, no overlap (audit 2026-09-04); indiscernibility at eV scales forbids any “TQNT-specific” gain.

Prediction	Refuted if
$T_2(\text{trefoil})/T_2(\text{rectangle}) = 1$ (within fabrication systematics, $\pm \sim 30\%$)	reproducible ratio > 10 (would refute <i>indiscernibility</i> — and resurrect B8)
No dependence of T_2 on the etched-pattern topology (trefoil, rectangle, ring)	any reproducible topological dependence

The value of the test: if the framework is right, it *predicts the failure of its own former patent* — the opposite of confirmation bias; any team can redo it (differential protocol, same wafer).

Accountability conditions

(i) The values above are frozen at the deposit date; (ii) a prediction missed within its window counts *against* the theory and will be recorded as such in the monograph (in the falsification register F1–F3, whose history shows the practice); (iii) *absence* predictions are refutable by any confirmed detection; (iv) any update will go through a new timestamped version, without withdrawal of the present one. Reference: TQNT-V6 monograph (associated Zenodo deposit), scripts of the software repository.