

# Nine Numbers, and the Measurement That Can Kill Each One

**The paper, stripped of narrative.** Its content is nine numbers and the machinery that stands behind them — each with its value, its status, the Part in which it is proved, and the measurement that can end it. The status column is the honest one: *calibrated* where one scale is set by the observed abundance and declared as such; *derived* where a theorem is combined with a Standard-Model input; *derived-conditional* where the derivation rests on a named open computation; *ladder* for the discrete window read from the geometry’s integers by an ansatz; *fitted* for the angle read back from the abundance. Nothing in the last column waits on future theory; all of it waits on data, and two programs — IBS-CAPP in Korea, running, and ADMX-EFR at Fermilab, designed and awaiting a funding decision — would take it between now and the early 2030s. In full: Table 35, p. 195.

| Quantity                         | Value                                             | Status                                      | Proved      | Killed by             |
|----------------------------------|---------------------------------------------------|---------------------------------------------|-------------|-----------------------|
| 1 mass $m_K$                     | $8.1 \mu\text{eV} (\pm 1.3\%)$                    | calibrated                                  | (via Part V | F-Kaxion-1c/1d        |
| 2 frequency $\nu_K$              | $1.95 \text{ GHz} (\pm 25 \text{ MHz})$           | $f_K$<br>calibrated                         | (via Part V | F-Kaxion-1c/1d        |
| 3 window                         | $[1.59, 2.13] \text{ GHz}$                        | discrete ladder                             | Part V      | F-Kaxion-1c           |
| 4 line count                     | single (no partner tone)                          | derived-cond.<br>(T-Kaxion-5)               | Part VI     | (count test, Part VI) |
| 5 coupling $g_{K\gamma\gamma}$   | $(1.2 \pm 0.07) \times 10^{-15} \text{ GeV}^{-1}$ | derived (DFSZ;<br>via $f_K$ )               | Part V      | F-Kaxion-1c           |
| 6 decay constant $f_K$           | $7.1 \times 10^{11} \text{ GeV}$                  | calibrated;<br>bench. $\Xi_{\text{cap}}=43$ | Part V      | (via 1–3)             |
| 7 misalignment angle $\theta_i$  | $1.18 \pm 0.04 \text{ rad}$                       | the convention’s<br>output                  | Part V      | (via 8)               |
| 8 abundance $\Omega_{\text{DM}}$ | $1/\pi - 1/(2\pi^2) = 0.2676$                     | derived (GG-<br>A10-Cosmos,<br>cond.)       | Part III    | CMB                   |
| 9 lifetime $\tau_K$              | $\simeq 4 \times 10^{32} t_U$                     | derived                                     | Part V      | (stability)           |