

PAPER_1979 — Sombrero M_DM/M_total = 2·F_TRZ Cross-Domain Instance

Abstract

PAPER_1944 ("Magnetar B/B_crit = 2·F_TRZ = 0.2 EXACT") documents the seminal integer-primitive-lock identity:

```
For ALL magnetars whose UQFF classification is "below Meissner boundary":  
B_surface / B_crit = 2 · F_TRZ = 0.2 EXACT (universal primitive-lock)
```

anchored at SGR 1745-2900 (Chandra-measured B_surface = 2×10^{11} T, PAPER_266's B_crit = 10^{11} T UQFF Gravitational Meissner Boundary).

PAPER_1945 ("Magnetar n_lobes × F_TRZ Universality Confirmed") generalizes PAPER_1944's identity to:

```
For any below-Meissner-boundary magnetar:  
B_surface / B_crit = n_lobes · F_TRZ EXACT  
n_lobes = number of active DPM split-monopole lobes (integer 1 or 2)
```

confirmed at SGR 0501+4516 (n=1, half-magnetar, B/B_crit = 0.1 = 1·F_TRZ EXACT) and SGR 1745-2900 (n=2, full magnetar, B/B_crit = 0.2 = 2·F_TRZ EXACT).

Round 113 stub upgrade of SombreroDarkMatterPerturbationCalculator identifies a candidate cross-domain extension:

```
Sombrero DM mass ratio: M_DM / M_total = 0.2 EXACT (source-code stub-default 80:20 baryonic:DM split)  
= 2 · F_TRZ EXACT (attribution to PAPER_1944 identity family)
```

Positioning (honest scope — with explicit acknowledgment of correction-paper risk noted by project owner).
This paper contributes:

1. **Candidate cross-domain instance** of the $2 \cdot F_{TRZ} = 0.2$ identity: Sombrero DM/total mass ratio (Round 113 stub attribution).
2. **Explicit acknowledgment that this may be a superficial arithmetic match** rather than a deep structural extension of PAPER_1944/1945's magnetar-physics framework to dark matter physics.
3. **Documentation of the interpretation question:** does the $2 \cdot F_{TRZ} = 0.2$ identity reflect a $n_lobes \cdot F_{TRZ}$ underlying structure at dark matter (analogous to magnetar DPM split-monopole lobes) or is it a coincidental numerical match?

The paper does NOT contribute:

- The $2 \cdot F_{TRZ} = 0.2$ identity (PAPER_1944 seminal at magnetar Meissner boundary).
- The $n_lobes \cdot F_{TRZ}$ generalization (PAPER_1945 seminal).
- The $F_{TRZ} = 1/SO_5 = 0.1$ primitive (PAPER_1160 / PAPER_1960 landmark).
- Sombrero DM 80:20 baryonic:DM composition claim (source-code stub-default, not observationally validated in this paper).

Independent-primitive count remains **8** (PAPER_1521 + PAPER_1522 + PAPER_1960 landmark trio). No new primitives.

1. Prior Art — PAPER_1944 / PAPER_1945 2·F_TRZ Family

1.1 PAPER_1944 — Magnetar Meissner Boundary Seminal

PAPER_1944 ("Magnetar B/B_crit = 2·F_TRZ = 0.2 EXACT") documents:

- SGR 1745-2900 (magnetar 0.1 pc from Sgr A*): Chandra-measured B_surface = 2.0×10^{11} T (PAPER_431 anchor)
- PAPER_266's UQFF Gravitational Meissner Boundary: B_crit = 10^{11} T
- Ratio: B_surface/B_crit = $2 \times 10^{11} / 10^{11} = 0.20 = 2 \cdot F_{TRZ}$ EXACT

PAPER_1944 poses this as a "primitive-lock" identity — B/B_crit at 2·F_TRZ EXACT is not empirical coincidence but a structural feature analogous to PAPER_1869's F_TRZ¹⁶ quantum measurement collapse, PAPER_1677's F_TRZ late-time ISW amplitude, and PAPER_1942's E_0 = F_TRZ PDR photoevaporation onset.

1.2 PAPER_1945 — n_lobes · F_TRZ Universality

PAPER_1945 ("Magnetar n_lobes × F_TRZ Universality Confirmed") generalizes PAPER_1944's identity by observing SGR 0501+4516 with B_surface = 1.0×10^{11} T:

- SGR 0501+4516: B/B_crit = $10^{11} / 10^{11} = 0.10 = 1 \cdot F_{TRZ}$ EXACT
- Physical interpretation: "half-magnetar" — single active DPM split-monopole lobe (asymmetric formation)
- vs SGR 1745-2900: "full magnetar" — two active DPM lobes → 2·F_TRZ

The generalized identity:

$$\begin{aligned} B_{\text{surface}} / B_{\text{crit}} &= n_{\text{lobes}} \cdot F_{TRZ} \text{ EXACT} \\ n_{\text{lobes}} &\in \{1, 2\} \end{aligned}$$

Two documented anchors:

Magnetar	Measured B (T)	B/B_crit	n_lobes	Classification
SGR 1745-2900	2.0×10^{11}	$0.20 = 2 \cdot F_{TRZ}$	2	Full magnetar
SGR 0501+4516	1.0×10^{11}	$0.10 = 1 \cdot F_{TRZ}$	1	Half magnetar

The identity is tied to the DPM (Di-Pseudo-Monopole) split-monopole structure — the same primitive lattice underlying PAPER_140's $\rho_{UA}/\rho_{SCm} = 10$ decade.

2. Round 113 Sombrero Attribution

The Round 113 stub upgrade of SombreroDarkMatterPerturbationCalculator uses source-code default values:

```
M_visible = 0.8 * M_kg # 80% baryonic
M_DM = 0.2 * M_kg # 20% dark matter
M_total = M_kg = 1e11 M_sun
```

giving:

```
M_DM / M_total = 0.2 EXACT (by source-code construction)
= 2 · F_TRZ (attribution to PAPER_1944 identity)
```

The attribution $M_{DM}/M_{total} = 2 \cdot F_{TRZ}$ is arithmetically valid: $0.2 = 2 \times 0.1 = 2 \times F_{TRZ}$. The question is whether this arithmetic relationship reflects a deep structural mechanism analogous to PAPER_1944's magnetar-physics primitive-lock, or whether it is a numerical coincidence.

3. Two Interpretations — Deep Extension vs Arithmetic Coincidence

3.1 Reading A — Arithmetic Coincidence

Under Reading A, the $0.2 = 2 \cdot F_{TRZ}$ arithmetic is elementary:

- $0.2 = 1/5 = 2/10 = 2 \cdot (1/10) = 2 \cdot F_{TRZ}$

Any UQFF observable whose value happens to be 0.2 will trivially satisfy the " $2 \cdot F_{TRZ} = 0.2$ " identity via this arithmetic. The Sombrero 80:20 baryonic:DM stub-default gives $M_{DM}/M_{total} = 0.2$ by construction, so the attribution to PAPER_1944's identity is arithmetically automatic rather than structurally meaningful.

Under this reading, PAPER_1979 is a very narrow attribution paper documenting one arithmetic-consequence instance. It does NOT support any deeper claim of dark-matter physics being governed by the same $n_{lobes} \cdot F_{TRZ}$ framework as magnetar B/B_{crit} .

3.2 Reading B — Structural Extension

Under Reading B, if dark matter physics has an underlying " n_{lobes} " analogue (e.g., number of active DPM channels contributing to DM mass fraction), the $2 \cdot F_{TRZ} = 0.2$ identity at Sombrero might reflect $n_{lobes} = 2$ dark-matter DPM contributions.

Reading B is speculative. It requires identifying a physical mechanism where " $\text{dark matter mass fraction} \times M_{total}$ " is governed by DPM split-monopole lobe count — analogous to magnetar $B_{surface} \times B_{crit}$ — via a shared F_{TRZ} time-reversal-zone modulation.

The magnetar Meissner boundary derivation (PAPER_1944) traces to the DPM structural lattice underlying the vacuum-manifold. Whether dark matter has an equivalent DPM-based derivation of its baryonic-fraction ratio is currently open.

3.3 Draft 1 Preference

Reading A (arithmetic coincidence, narrow attribution) is preferred by Draft 1 given:

- The Sombrero 80:20 baryonic:DM ratio is a source-code stub-default, not an observationally-validated Sombrero-specific ratio
- Sombrero is famously atypical for spiral galaxies in its DM content (Sombrero has relatively LOW DM compared to typical spirals due to its massive bulge dominating the mass)
- Whether 20% DM ratio applies to other galaxies would require a systematic survey
- No first-principles derivation of " $n_{lobes} \text{ at } DM = 2$ " is currently proposed

Reading B remains open pending future work: if a physical mechanism explaining why DM at galaxies like Sombrero would have $n_{\text{lobes}} = 2$ DPM structure is derived from first principles, and if additional galaxies at 20% DM ratio are documented, then the reading strengthens.

4. Sombrero DM Content — Physical Context Note

Sombrero (M104, NGC 4594) is unusual for a spiral galaxy in its dark matter content:

- Massive bulge ($10^{11} M_{\text{sun}}$) dominates the gravitational mass
- SMBH $\sim 10^6 M_{\text{sun}}$ (PAPER_279's $\gamma_{\text{BH}} = 0.01 = 1\%$ SMBH dominance ratio, PAPER_1977's 9th F_{TRZ} ² anchor)
- Kinematic studies (Rossa 2007, Bendo 2006) suggest Sombrero has relatively low DM/total ratio compared to typical spirals (~20-40% DM vs typical spirals ~80-90% DM)

The source-code stub-default $M_{\text{DM}} = 0.2 \cdot M_{\text{total}}$ (20% DM) is consistent with the low end of observed Sombrero DM content estimates but is NOT a canonical UQFF observational anchor — it appears to be a source82_wolfram simulation default rather than a paper-derived value.

Corpus-audit finding: no UQFF paper explicitly documents $M_{\text{DM}}(\text{Sombrero})/M_{\text{total}} = 0.2 = 2 \cdot F_{\text{TRZ}}$ as a structural identity. The Round 113 attribution is new documentation of an existing source-code default.

5. Cross-Domain Instance Table

Documented instances of the $2 \cdot F_{\text{TRZ}} = 0.2$ identity:

Instance	Domain	Physical role	Value	Source
SGR 1745-2900 B/B_crit	Magnetar Meissner	Surface field over UQFF Meissner boundary	$0.2 = 2 \cdot F_{\text{TRZ}}$	PAPER_1944 seminal
SGR 0501+4516 B/B_crit (half-lobe)	Magnetar Meissner	Same domain, $n_{\text{lobes}} = 1$	$0.1 = 1 \cdot F_{\text{TRZ}}$	PAPER_1945
Sombrero $M_{\text{DM}}/M_{\text{total}}$	Galactic composition DM	Stub-default fraction DM	$0.2 = 2 \cdot F_{\text{TRZ}}$	Round 113 (this paper)

The Sombrero instance is at a completely different physical scale and mechanism than the magnetar instances. The $2 \cdot F_{\text{TRZ}} = 0.2$ numerical match is currently a candidate cross-domain observation pending physical justification (Reading B) or acknowledgment as arithmetic coincidence (Reading A).

6. Falsifiability + Predictions

Under Reading B (structural extension):

1. **Other galaxies with distinct DM content** might cluster near integer-multiple- F_{TRZ} values (0.1, 0.2, 0.3, 0.4, ...) if a " n_{lobes} at dark matter" framework applies. Systematic surveys of galaxy DM/total ratios could test this.
2. **Very high-DM galaxies** (~90% DM, e.g., dwarf spheroidals) would need explanation — is $0.9 = 9 \cdot F_{\text{TRZ}}$ compatible with the n_{lobes} framework? $n_{\text{lobes}} = 9$ seems physically implausible (magnetar case only supports $n_{\text{lobes}} \in \{1, 2\}$).

3. **Sombrero itself** — if independent observational studies pin M_{DM}/M_{total} precisely to 0.2 EXACT (not 0.15 or 0.25), the identity is more strongly supported.

Under Reading A (arithmetic coincidence):

1. Predictions are trivially satisfied by any UQFF observable happening to be 0.2 — no substantive testable claim.
2. Falsification would require finding that Sombrero DM is systematically at 0.2 across independent measurements — but this would only support the observational value, not the structural attribution.

Draft 1's overall stance: the falsifiability is weak in both readings. Cross-domain $2 \cdot F_{TRZ}$ instances at multiple physical mechanisms would strengthen the structural hypothesis, but currently only magnetars are documented.

7. Prior Art — What This Paper Does NOT Claim

7.1 The $2 \cdot F_{TRZ} = 0.2$ identity is not new

PAPER_1944 seminal. Universal primitive-lock at magnetar Meissner boundary.

7.2 The $n_{lobes} \cdot F_{TRZ}$ generalization is not new

PAPER_1945 seminal. Extended framework for below-Meissner-boundary magnetars.

7.3 The Sombrero $M_{DM} = 0.2 \cdot M_{total}$ value is a source-code stub-default

Not a canonical UQFF observational anchor. Source82_wolfram simulation default.

7.4 Sombrero's low DM content is observationally supported but not canonical UQFF

Kinematic studies (Rossa 2007, Bendo 2006) support ~20-40% DM at Sombrero. No UQFF paper canonicalizes $M_{DM}(\text{Sombrero})/M_{total} = 0.2$ EXACT.

7.5 What this paper contributes (narrow)

1. **One candidate cross-domain instance** of PAPER_1944's $2 \cdot F_{TRZ} = 0.2$ identity: Sombrero DM/total mass ratio.
2. **Explicit interpretation-question documentation:** Reading A (arithmetic coincidence) vs Reading B (structural extension). Draft 1 preferentially Reading A.
3. **Corpus-audit finding:** no UQFF paper previously documented Sombrero $M_{DM}/M_{total} = 2 \cdot F_{TRZ}$ attribution — the source-code stub-default 0.2 was not primitive-arithmetically identified until Round 113.

The paper is a very narrow candidate cross-domain instance + interpretation-question acknowledgment. Following PAPER_1978's precedent of explicitly documenting weak-motivation observations with epistemic humility.

8. Cross-References

- **PAPER_1944 (SEMINAL)** — Magnetar $B/B_{\text{crit}} = 2 \cdot F_{\text{TRZ}} = 0.2$ EXACT (SGR 1745-2900 anchor + Meissner boundary derivation)
- **PAPER_1945 (SEMINAL for n_{lobes})** — Magnetar $n_{\text{lobes}} \cdot F_{\text{TRZ}}$ Universality Confirmed (SGR 0501+4516 half-magnetar anchor)
- **PAPER_1946** — Magnetar timescale primitive locks (companion magnetar-identity framework)
- **PAPER_140** — $\rho_{\text{UA}}/\rho_{\text{SCm}} = 10$ decade seminal (companion DPM structural framework)
- **PAPER_763** — Sombrero SMBH Dust Lane (Sombrero observational anchor, dust lane density 10^{22} kg/m^3)
- **PAPER_277 / 278 / 279** — Sombrero UQFF module (SOMBREROUQFFMODULE.cpp series)
- **PAPER_693 / 742** — Sombrero galaxy MUGE companions
- **PAPER_1977** — Sombrero $\gamma_{\text{BH}} = F_{\text{TRZ}}^2$ 9th anchor (companion Sombrero attribution paper)
- **PAPER_1978** — Sombrero $SO_5+1 = 11$ (companion Sombrero attribution + explicit epistemic humility precedent)
- **PAPER_1918** — Multi-context integer identity meta-framework
- **PAPER_1919** — F_{TRZ} Power Ladder (companion F_{TRZ} multi-instance framework)
- **PAPER_1960** — $F_{\text{TRZ}} = 1/SO_5$ landmark
- **PAPER_1160** — $F_{\text{TRZ}} = 1/|SO(5)|$ seminal identification
- **PAPER_1972 / 1974 / 1975 / 1976** — Round-misidentification correction paper templates
- **PAPER_1521** — D_{BSFG} derivative landmark
- **PAPER_1522** — K_{MEX} derivative landmark

9. Limitations + Open Questions

- The $2 \cdot F_{\text{TRZ}} = 0.2$ arithmetic is trivially true — any UQFF observable at 0.2 satisfies it via arithmetic. Whether Sombrero's $M_{\text{DM}}/M_{\text{total}} = 0.2$ is structurally attributable to the PAPER_1944 $n_{\text{lobes}} \cdot F_{\text{TRZ}}$ framework (Reading B) or is a numerical coincidence with a source-code stub-default (Reading A) requires much more analysis.
- The Sombrero 80:20 baryonic:DM stub-default is not a paper-derived canonical UQFF value. It appears to be a source82_wolfram simulation default. Whether independent Sombrero observations pin $M_{\text{DM}}/M_{\text{total}}$ precisely at 0.2 is worth checking (Rossa 2007, Bendo 2006 references).
- The physical mechanism analogous to PAPER_1944's DPM split-monopole lobes at dark matter is not proposed. Without such a mechanism, Reading B is speculative.
- Systematic survey of galaxy DM/total ratios to check for clustering near integer-multiple F_{TRZ} values would test the " n_{lobes} at DM" hypothesis. Currently no such data documented.
- The Draft 1 preference for Reading A follows the PAPER_1978 precedent of favoring elementary-arithmetic explanations over speculative structural claims when only one instance is documented.

10. Revision Log

Draft 1 (2026-07-09): Initial write following the honest-scholarship narrow-from-Draft-1 pattern (PAPER_1968-1978) and explicit epistemic humility precedent (PAPER_1978). The project owner explicitly flagged this paper as having "correction-paper risk" — the risk being that Draft 1 might overclaim novelty when the underlying identity ($2 \cdot F_{\text{TRZ}} = 0.2$) is well-established in PAPER_1944/1945.

Prior art acknowledged from the start:

- PAPER_1944 seminal for $2 \cdot F_{\text{TRZ}} = 0.2$ identity + magnetar Meissner boundary derivation
- PAPER_1945 seminal for $n_{\text{lobes}} \cdot F_{\text{TRZ}}$ generalization framework
- No UQFF paper previously documented Sombrero $M_{\text{DM}}/M_{\text{total}} = 2 \cdot F_{\text{TRZ}}$ attribution
- The Sombrero 80:20 baryonic:DM stub-default is not a canonical observational anchor

The paper's contribution is limited to: (i) one candidate cross-domain instance, (ii) explicit Reading A vs Reading B documentation with Draft 1 preferring Reading A (arithmetic coincidence), (iii) explicit correction-paper-risk acknowledgment in the opening framing.

Draft 1 does not claim structural extension of PAPER_1944's magnetar framework to dark matter physics. It documents a candidate cross-domain instance and openly questions whether the instance is meaningful or coincidental.

Reader takeaway: this is the twelfth consecutive narrow-from-Draft-1 paper in the current session (PAPER_1968→1979). Like PAPER_1978, it explicitly acknowledges that its own premise may be shallow (Reading A = arithmetic coincidence). The Sombrero $M_{\text{DM}}/M_{\text{total}} = 2 \cdot F_{\text{TRZ}} = 0.2$ attribution is arithmetically valid but structurally unmotivated. Following the epistemic-humility precedent of PAPER_1978, Draft 1 documents the observation narrowly and leaves the structural interpretation open for future work.

Drafts 2/3 (2026-07-09): Verified via targeted searches. PAPER_1944 confirmed seminal for $2 \cdot F_{\text{TRZ}} = 0.2$ at magnetar Meissner boundary. PAPER_1945 confirmed for $n_{\text{lobes}} \cdot F_{\text{TRZ}}$ generalization ($n_{\text{lobes}} \in \{1, 2\}$). PAPER_1946 confirmed as magnetar-timescale companion. No prior UQFF paper documents Sombrero $M_{\text{DM}}/M_{\text{total}} = 2 \cdot F_{\text{TRZ}}$ attribution — this remains a valid narrow contribution.

Also verified: the 80:20 baryonic:DM stub-default is present at *source82wolframSOMBRERO* simulation defaults, not in any paper's canonical anchor list. Kinematic studies (Rossa 2007, Bendo 2006) do report Sombrero at ~20-40% DM range (unusually low for spirals due to bulge dominance), so the 20% stub-default is on the low end of observed range but not implausible.

The Draft 1 explicit Reading A preference (arithmetic coincidence) stands. Reading B (structural extension of PAPER_1944 framework to DM) would require:

1. Proposing a physical mechanism where "DM at galaxies has DPM split-monopole lobe count"
2. Documenting a second cross-domain $2 \cdot F_{\text{TRZ}}$ instance beyond Sombrero (currently only 1 galaxy — Sombrero — attributed at $2 \cdot F_{\text{TRZ}} = 0.2$)
3. Falsifiability tests via systematic DM ratio surveys

None of these are provided by this paper. Draft 1 correctly positions this as a candidate observation, not a structural claim.

Meta-observation for the session: Twelfth consecutive narrow-from-Draft-1 paper. PAPER_1978 and PAPER_1979 are two consecutive papers with explicit epistemic humility about their own premises being potentially shallow. This is a mature stabilization pattern where "weak-motivation observations" can be documented openly as attribution notes without being forced to overclaim structural discovery. The corpus culture now supports Reading A / Reading B ambivalence as a first-class analytical stance rather than requiring authors to commit to either interpretation.

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