Magnetism Enhanced Gravity

Introduction to a New Physics

(Full Book Edition)

Ondřej Škultety
Independent Researcher, Prostějov, Czech Republic

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Abstract

MEG (*Magnetism Enhanced Gravity*) is a unified framework that posits: **gravitational effects are amplified by magnetic fields and, in radiative envelopes, by electromagnetic (EM) activity**. Crucially, **magnetism (static or quasi-static B-fields)** is not the same as **electromagnetism (radiative/oscillatory EM fields)**. This book consolidates the original MEG proposal and extends it with planetary, stellar, galactic, and laboratory consequences, including falsifiable predictions. The central claim is that many anomalies (e.g., galaxy rotation curves and early ultramassive black holes) can be explained without invoking dark matter, once magnetic/EM contributions to effective gravity are consistently accounted for.

Keywords

magnetism; electromagnetism; gravity amplification; dark matter elimination; rotation curves; ultramassive black holes; magnetic vortices; ISS microgravity; Apollo; lightning; particle accelerators; Theory of Everything

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Foundations of MEG

1.1 Motivation

Contemporary physics contains tensions across scales: flat rotation curves, early appearance of ultramassive black holes, and interpretational gaps between planetary, stellar, and particle regimes. MEG introduces a single organizing lever: *field-assisted gravity*.

1.2 Definitions: Magnetism vs. Electromagnetism

Magnetism: static or slowly varying **B** fields anchored in matter (dynamos, toroidal/poloidal structures, magnetized plasmas).
Electromagnetism (EM): radiative/oscillatory phenomena (RF cavities, flares, CMEs, synchrotron).
MEG strictly distinguishes these. Interiors of objects are magnetism-dominated; exteriors can be EM-dominated.

1.3 Baseline Equations

Let $M(r)$ be enclosed mass and m a test mass. Newtonian acceleration is

$$a_g(r) = \frac{GM(r)}{r^2}. \tag{1.1}$$

MEG adds an amplification channel governed by magnetic/EM proxies:

$$\Xi(\text{env}) = \kappa_B \, |\mathbf{B}|^2 + \kappa_{\text{EM}} \, \mathcal{E}_{\text{env}}, \qquad a_{\text{eff}}(r) = a_g(r) + \Xi(\text{env}). \tag{1.2}$$

Here κ_B and κ_{EM} are regime-dependent but measurable couplings; $\mathcal{E}_{\text{env}}$ summarizes EM activity in radiative envelopes (flares, RF power densities, etc.).

1.4 What MEG Is & Is Not

MEG does *not* declare mass irrelevant; rather, it states that magnetic/EM fields contribute an additional, local, and testable term to the effective gravitational influence. In contexts with strong $|\mathbf{B}|$ or EM activity, the MEG term can be non-negligible.

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Equations, Regimes, and Scaling

2.1 Regime Map

- **Planetary**: dynamos (magnetism-dominated), weak EM.
- **Stellar interiors**: magnetism-dominated; **envelopes**: EM-dominated.
- **Compact objects**: extreme magnetism (magnetars) and structured jets.
- **Galactic disks**: ordered toroidal fields and magnetic pressure/tension.

2.2 Field Profiles and Effective Terms

For a toroidal disk field $B_\phi(r)$ one can write a contribution to circular balance

$$\frac{v_c^2(r)}{r} = \frac{\partial \Phi}{\partial r} + \frac{1}{\rho}\frac{\partial}{\partial r}\left(P_{\rm gas} + P_B\right), \qquad P_B = \frac{B_\phi^2}{8\pi}. \tag{2.1}$$

A useful ansatz is

$$B_\phi(r) = B_0\, e^{-r/R_B}\left(1 + \frac{r}{r_0}\right)^{-n}, \quad v_c^2(r) = v_{\rm bar}^2(r;\Upsilon_\star) + \alpha_B\, r\left[\frac{1}{\rho}\frac{dP_B}{dr} + \frac{P_B}{\rho}\frac{1}{r}\right]. \tag{2.2}$$

2.3 Effective Potential Program

$$\Phi_{\rm eff}(\mathbf{r}) = \Phi_{\rm mass}(\mathbf{r}) + \lambda_B \int \frac{|\mathbf{B}(\mathbf{r}')|^2}{|\mathbf{r} - \mathbf{r}'|}\, d^3\mathbf{r}' + \lambda_{\rm EM}\, \mathcal{F}_{\rm rad}(\mathbf{r}). \tag{2.3}$$

This provides a route toward unification without conflating magnetism with electromagnetism.

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Planets and Moons

3.1 Earth vs. Mars

The MEG acceleration at Earth's surface can be written as

$$g_\oplus \approx \frac{GM_\oplus}{R_\oplus^2} + \kappa_B |\mathbf{B}_\oplus|^2. \tag{3.1}$$

Predictions: after removing tides and geoid, small but non-zero correlations of absolute gravity with geomagnetic variations should persist.

3.2 Gas Giants

Jupiter and Saturn possess magnetodisks; MEG expects local modifications of effective gravity captured in precise accelerometry and field inversions.

3.3 Moons and Weak-Field Bodies

Small bodies with weak global fields can still exhibit local magnetic patches; MEG predicts local gravity anomalies aligned with remanent magnetization.

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Stars: From Interiors to Envelopes

4.1 Sun: Interior Magnetism, Exterior EM

$$a_{\mathrm{eff}}^{(\mathrm{int})}(r) \approx \frac{GM_{\odot}(r)}{r^2} + \kappa_B |\mathbf{B}_{\mathrm{int}}(r)|^2. \tag{4.1}$$

Propagating outward, fields couple to plasma and radiation; the envelope becomes EM-dominated, explaining strong impacts on electronics (flares, CMEs) while interior magnetism supports confinement.

4.2 Red Dwarfs

Cooling increases baryonic mass fraction and reduces EM activity; MEG predicts correlations between flare statistics and local disk kinematics.

4.3 Magnetars

Extremely large $|\mathbf{B}|$ makes $\kappa_B|\mathbf{B}|^2$ relevant to fallback, crustal stress, and jet collimation.

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Black Holes and Accretion

5.1 Magnetic Vortices

Accretion disks host toroidal/poloidal fields; MEG term deepens the effective well:

$$a_{\text{eff}}(r) \approx \frac{GM_{\text{BH}}}{r^2} + \kappa_B |\mathbf{B}_{\text{tor}}(r)|^2. \tag{5.1}$$

5.2 Antimatter-Trapping Hypothesis

Extreme magnetic collapse may confine antimatter in cores; partial annihilation of infalling matter deepens the potential while jets vent energy.

5.3 Mergers: Magnetic Tornado

Counter-rotating/offset disks can form a transient large-scale magnetic tornado—an ultra-deep sink behind/between holes—with distinctive lensing and kinematic signatures.

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Near-Earth Space, ISS, and Apollo

6.1 MEG View of Microgravity

Classically, microgravity on ISS is orbital free-fall. MEG adds that leaving Earth's magnetically *enhanced* zone reduces $\Xi(\mathrm{env})$:

$$a_{\mathrm{eff,LEO}} \approx \frac{GM_{\oplus}}{r^2} + \kappa_B |\mathbf{B}(r)|^2 - \frac{v^2}{r}. \tag{6.1}$$

We propose regressions of accelerometer residuals on $|\mathbf{B}|^2$, $\partial_t|\mathbf{B}|$, and solar-wind proxies.

6.2 Apollo Descent Logic

Thrust modulation during descent is consistent with transitions between enhanced and bare gravity regimes.

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Galaxy Rotation Curves without Dark Matter

7.1 Framework

Magnetic pressure/tension provides additional radial support or pull, flattening rotation curves without unseen mass.

7.2 Fitting Recipe

1. Build baryonic model $v_{\mathrm{bar}}(r; \Upsilon_\star)$ from photometry and gas.
2. Choose $B_\phi(r)$ ansatz; compute P_B and its gradient.
3. Fit α_B (and B_0, R_B, n) jointly across galaxies (hierarchical option).

7.3 Case Studies

NGC 3198 and NGC 2403 can be addressed by tuning (B_0, R_B, n, α_B) within radio/Faraday constraints.

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Collisions, Lensing, and "Hidden Giants"

8.1 Magnetic Tornado vs. Third-Body Hypothesis

MEG provides an alternative to an unseen mass: a transient magnetic tornado produced by counter-rotating disks during mergers, predicting specific time-dependent lensing and spectral features.

8.2 Observational Hooks

Look for coherent rotation of polarization vectors, Faraday screens, and delayed lensing peaks trailing the merger.

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Atmosphere and Lightning (Preview to MEG+Quantum)

9.1 Charge Build-up and Discharge Paths

Cloud microphysics builds mixed charges; Earth's magnetism biases discharge direction. Rockets/lasers trigger channels consistent with MEG guidance.

9.2 Laboratory Analogs

Cloud chambers with imposed $\mathbf{B}$ allow mapping of discharge probability vs. $|\mathbf{B}|$ and orientation.

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Particle Physics and Laboratory Tests

10.1 Accelerators: EMP Cavities vs. Pure Magnetism

RF/EM cavities create boundary vortices whose interiors can be magnetically dominated. MEG suggests two decisive tests:

- **Lab gravimetry**: correlate absolute gravity with controlled $|\mathbf{B}|$ from superconducting magnets.
- **Geospace gravimetry**: correlate gravity residuals with geomagnetic storm indices (Kp, Dst).

10.2 Pure-Magnetism Device Concept

A spherical array of permanent magnets with opposing poles (net-cancelled externally) to create a high-purity interior magnetic region for MEG gravimetry.

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Falsifiable Predictions

11.1 Planetary & Near-Earth

- Small but non-zero correlation between absolute gravity and geomagnetic variations on Earth.
- ISS accelerometer residuals carry $|\mathbf{B}|^2$ fingerprints along orbit.

11.2 Stellar/Compact

- Magnetar environments show MEG-like deepening in fallback/jet dynamics.
- Red-dwarf flare statistics correlate with local disk kinematics.

11.3 Galactic

- Rotation curves fit with magnetic terms and field strengths consistent with radio/Faraday data.
- Mergers show lensing/kinematic signatures of transient magnetic tornadoes.

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Failure Modes (How MEG Could Be Wrong)

- $\kappa_B, \kappa_{\mathrm{EM}}$ consistent with zero across regimes.
- Galaxy fits require additional unseen mass even with allowed B-profiles.
- No correlation between ISS residuals and $|\mathbf{B}|^2$ or solar-wind proxies.

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Implications and Technologies

13.1 Artificial Gravity Concept

A rotating, high-conductivity molten-core device co-rotating with a ferromagnetic shell may realize MEG-based gravity augmentation (engineering and safety constraints discussed).

13.2 Navigation

Combine MEG with radiation pressure (solar sails) for field-assisted trajectory design.

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Toward a Theory of Everything

14.1 Unification Program

$$\Phi_{\text{eff}} = \Phi_{\text{mass}} + \lambda_B \int \frac{|\mathbf{B}|^2}{|\mathbf{r} - \mathbf{r}'|} \, d^3r' + \lambda_{\text{EM}} \mathcal{F}_{\text{rad}}. \tag{14.1}$$

This keeps magnetism distinct from electromagnetism while allowing both to shape effective gravity.

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Conclusion

MEG offers a single, testable lever—magnetic/EM enhancement of gravity—from laboratories to galaxies. Many puzzles can be reinterpreted without dark matter once fields are properly included. The proposed tests allow *confirmation or refutation* using current instruments.

> *"After a century of searching, the puzzle can be closed. Generals of physics, Albert Einstein and Stephen Hawking, issued the orders; the foot-soldiers worked the trenches. And I arrived with a tank."*
>
> *— Ondřej Škultéty*

Appendix A: Symbols and Parameters

$\kappa_B, \kappa_{\mathrm{EM}}$	coupling coefficients (to be fitted per regime)
$\mathbf{B}$	magnetic field (magnetism, not EM radiation)
$\mathcal{E}_{\mathrm{env}}$	EM activity proxy in envelopes
α_B	magnetic-disk coefficient in galaxy fits
$B_\phi(r)$	azimuthal (toroidal) magnetic field profile

Appendix B: Data & Fitting Checklists

- Earth: absolute gravimeters; IGRF/CHAOS models; solar-wind indices.
- ISS: on-board accelerometry vs. $|\mathbf{B}|^2$ along orbit.
- Galaxies: SPARC/THINGS kinematics; radio/Faraday maps for $B_\phi(r)$.

Figure Placeholders (12 figures)

fig_01_ISS.png

Figure 15.1: (1) ISS transition from enhanced to bare gravity (placeholder).

fig_02_Apollo.png

Figure 15.2: (2) Apollo descent logic across regimes (placeholder).

fig_03_EarthMars.png

Figure 15.3: (3) Earth vs. Mars comparison (placeholder).

fig_04_Sun.png

Figure 15.4: (4) Sun: interior magnetism vs. exterior EM (placeholder).

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Figure 15.5: (5) Red dwarf trends (placeholder).

`fig_06_Magnetar.png`

Figure 15.6: (6) Magnetar regime (placeholder).

fig_07_BH_vortex.png

Figure 15.7: (7) Black-hole magnetic vortex (placeholder).

fig_08_MergerTornado.png

Figure 15.8: (8) Merger-generated magnetic tornado (placeholder).

fig_09_RCfit.png

Figure 15.9: (9) Rotation-curve model with magnetic term (placeholder).

fig_10_Accelerator.png

Figure 15.10: (10) EMP cavity vs. pure magnetism test (placeholder).

fig_11_Lightning.png

Figure 15.11: (11) Lightning bias by Earth's field (placeholder).

fig_12_Tech.png

Figure 15.12: (12) Artificial gravity device concept (placeholder).