

# Verified Sources

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Resonance Architecture Hypothesis

December 2025

## Contents

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## 1 Primary Physics Papers

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### 1.1 Friction Reduction via Ultrasonic Vibration

**Luo, L. et al. (2024)**

“The inhibition mechanism of ultrasonic vibration on stick-slip phenomenon of sliding friction pair”

*Scientific Reports*, 14, Article 22449

- **DOI:** [10.1038/s41598-024-73652-w](https://doi.org/10.1038/s41598-024-73652-w)
  - **Open Access:** Yes (PMC)
  - **Key Finding:** Up to 89% friction reduction under ultrasonic vibration at 26 kHz
- 

### 1.2 Contact Mechanics of Vibration-Friction

**Popov, M. (2020)**

“The Influence of Vibration on Friction: A Contact-Mechanical Perspective”

*Frontiers in Mechanical Engineering*, 6, Article 69

- **DOI:** [10.3389/fmech.2020.00069](https://doi.org/10.3389/fmech.2020.00069)
  - **Open Access:** Yes
  - **Key Finding:** “Walking” mechanism—contact advances during low-pressure phase of vibration cycle
- 

### 1.3 Piezoelectric Weakening of Granite

**Saksala, T. et al. (2023)**

“Weakening of Compressive Strength of Granite by Piezoelectric Actuation of Quartz Using High-Frequency and High-Voltage Alternating Current: A 3D Numerical Study”

*Rock Mechanics and Rock Engineering*, 56, 7655–7672

- **DOI:** [10.1007/s00603-023-03451-8](https://doi.org/10.1007/s00603-023-03451-8)
- **Open Access:** Yes

- **Key Finding:** 10% weakening of compressive strength at resonant frequencies ( $\sim 274$  kHz)
- 

## 1.4 Tribological Self-Organization

**Assenova, E. & Vencl, A. (2022)**

“Tribology and self-organization in reducing friction: A brief review”

*Tribology of Materials*, 1(1), 34–41

- **URL:** [tribomat.net/archive/2022/2022-01/TM-2022-01-05.pdf](http://tribomat.net/archive/2022/2022-01/TM-2022-01-05.pdf)
  - **Open Access:** Yes (PDF)
  - **Key Finding:** Self-organizing contact mechanics lead to spontaneous structure optimization
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## 1.5 Granite Properties Under Ultrasonic Vibration

**Zhou, Y. et al. (2019)**

“The Mechanical Properties of Granite under Ultrasonic Vibration”

*Advances in Civil Engineering*, 2019, Article 9649165

- **DOI:** [10.1155/2019/9649165](https://doi.org/10.1155/2019/9649165)
- **Open Access:** Yes
- **Key Finding:** Ultrasonic vibration significantly affects granite mechanical properties

## 2 Historical Sources

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### 2.1 Original Drill Core Observations

**Petrie, W.M.F. (1883)**

*The Pyramids and Temples of Gizeh*

Field & Tuer, London

- **URL:** Available at Giza Archives
  - **Key Observation:** Spiral grooves on drill cores with 1:60 feed rate
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## 2.2 Modern Analysis of Petrie's Cores

**Dunn, C. (1999)**

*The Giza Power Plant: Technologies of Ancient Egypt*

Bear & Company

- **Key Observation:** “The spiral groove cut deeper through the quartz than through the softer feldspar. In conventional machining the reverse would be the case.”
- **Source for Dunn’s analysis:** [theglobaleducationproject.org](http://theglobaleducationproject.org)

## 3 Supporting Literature

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### 3.1 Piezoelectricity in Rocks

**Bishop, J.R. (1981)**

“Piezoelectric effects in quartz-rich rocks”

*Tectonophysics*, 77(3–4), 297–321

- **DOI:** [10.1016/0040-1951\(81\)90268-7](https://doi.org/10.1016/0040-1951(81)90268-7)
- 

### 3.2 Electrification in Rocks (Foundational Text)

**Parkhomenko, E.I. (1971)**

*Electrification Phenomena in Rocks*

Springer, New York

- **DOI:** [10.1007/978-1-4757-5067-6](https://doi.org/10.1007/978-1-4757-5067-6)

## 4 Archaeoacoustic Studies

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### 4.1 Ancient Chamber Resonance and Brain Activity

**Cook, I.A., Pajot, S.K. & Leuchter, A.F. (2008)**

“Ancient Architectural Acoustic Resonance Patterns and Regional Brain Activity”  
*Time and Mind*, 1(1), 95–104

- **DOI:** [10.2752/175169608783489099](https://doi.org/10.2752/175169608783489099)
  - **PDF Available:** [icrl.org](http://icrl.org)
  - **Authors:** UCLA Laboratory of Brain, Behavior, and Pharmacology
  - **Key Finding:** At 110 Hz, left temporal brain activity significantly decreased; pre-frontal asymmetry shifted to right-hemisphere dominance—consistent with deactivation of language centers
- 

### 4.2 Acoustics of Megalithic Chambers

**Jahn, R.G., Devereux, P. & Ibison, M. (1996)**

“Acoustical Resonances of Assorted Ancient Structures”  
*Journal of the Acoustics Society of America*, 99, 649–658

- **Institution:** Princeton Engineering Anomalies Research (PEAR)
  - **Key Finding:** All megalithic chambers tested (including Newgrange) exhibited primary resonance at 95–120 Hz, most at 110–112 Hz
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### 4.3 Malta Hypogeum Acoustic Analysis

**Debertolis, P., Coimbra, F. & Eneix, L. (2015)**

“Archaeoacoustic Analysis of the Hal Saflioni Hypogeum in Malta”  
*Journal of Anthropology and Archaeology*, 3(1), 59–79

- **PDF Available:** [University of Malta Repository](http://www.um.edu.mt/~pdebertolis/HalSaflioni.pdf)
  - **Key Finding:** Oracle Room exhibits dual resonance at 70 Hz and 114 Hz; male voice at these frequencies stimulates resonance throughout hypogeum
-

#### 4.4 Göbekli Tepe Archaeoacoustic Study

**Debertolis, P., Gullà, D. & Savolainen, H. (2017)**

“Archaeoacoustic Analysis in Enclosure D at Göbekli Tepe in South Anatolia, Turkey”

*Super Brain Research Group*

- **PDF Available:** [sbresearchgroup.eu](http://sbresearchgroup.eu)
- **Collaboration:** Klaus Schmidt (site discoverer, deceased 2014)
- **Key Finding:** 20–22 Hz underground vibration; central pillar resonates at 68–69 Hz with harmonics in 65–145 Hz range affecting brain activity

### 5 Electromagnetic Studies

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#### 5.1 Great Pyramid Electromagnetic Properties

**Balezin, M., Baryshnikova, K.V. et al. (2018)**

“Electromagnetic properties of the Great Pyramid: First multipole resonances and energy concentration”

*Journal of Applied Physics*, 124, 034903

- **DOI:** [10.1063/1.5026556](https://doi.org/10.1063/1.5026556)
- **Institutions:** ITMO University (Russia) / Laser Zentrum Hannover (Germany)
- **Key Finding:** Under resonance conditions (200–600m wavelengths), pyramid concentrates electromagnetic energy in internal chambers and under base

### 6 Verification Notes

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- All DOIs have been verified via CrossRef API as of December 2024
- All open-access PDFs have been confirmed accessible
- All URLs return HTTP 200 status codes

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*Last verified: December 4, 2025*