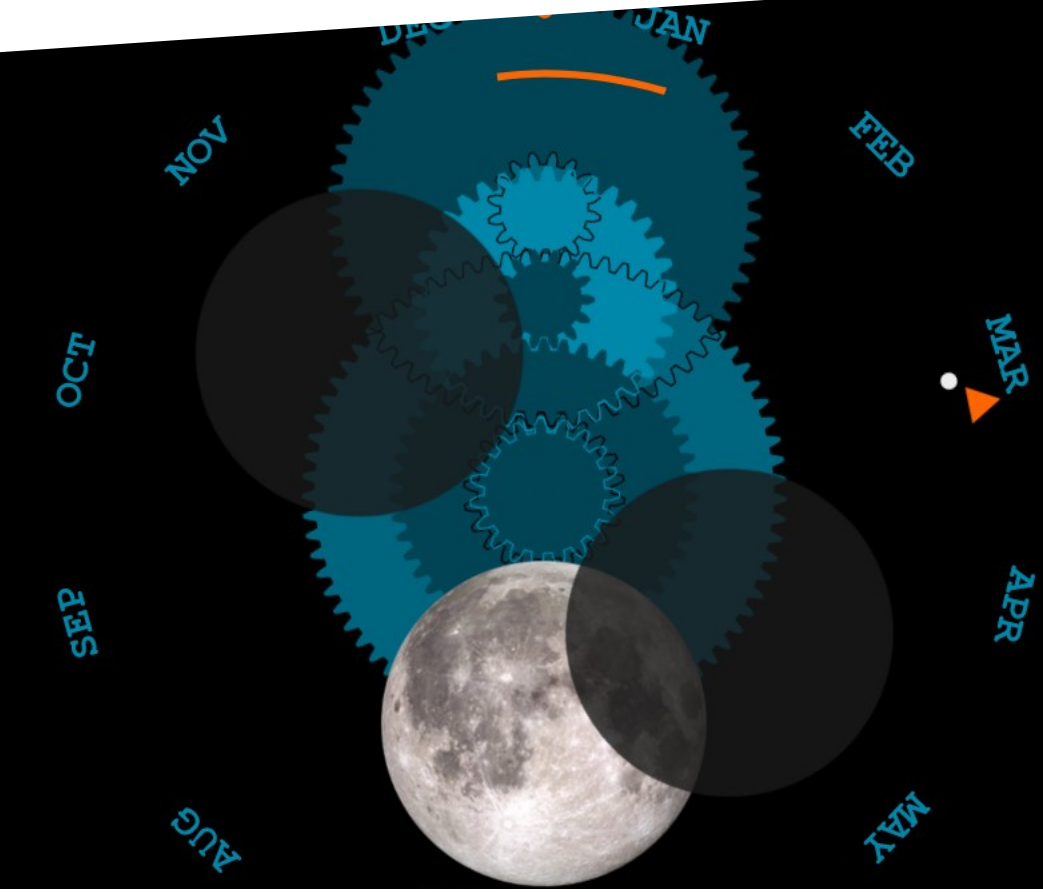
Fachhochschule Graubünden
University of Applied Sciences

Hochschule der Künste Bern
Haute école des arts de Berne
Bern Academy of the Arts



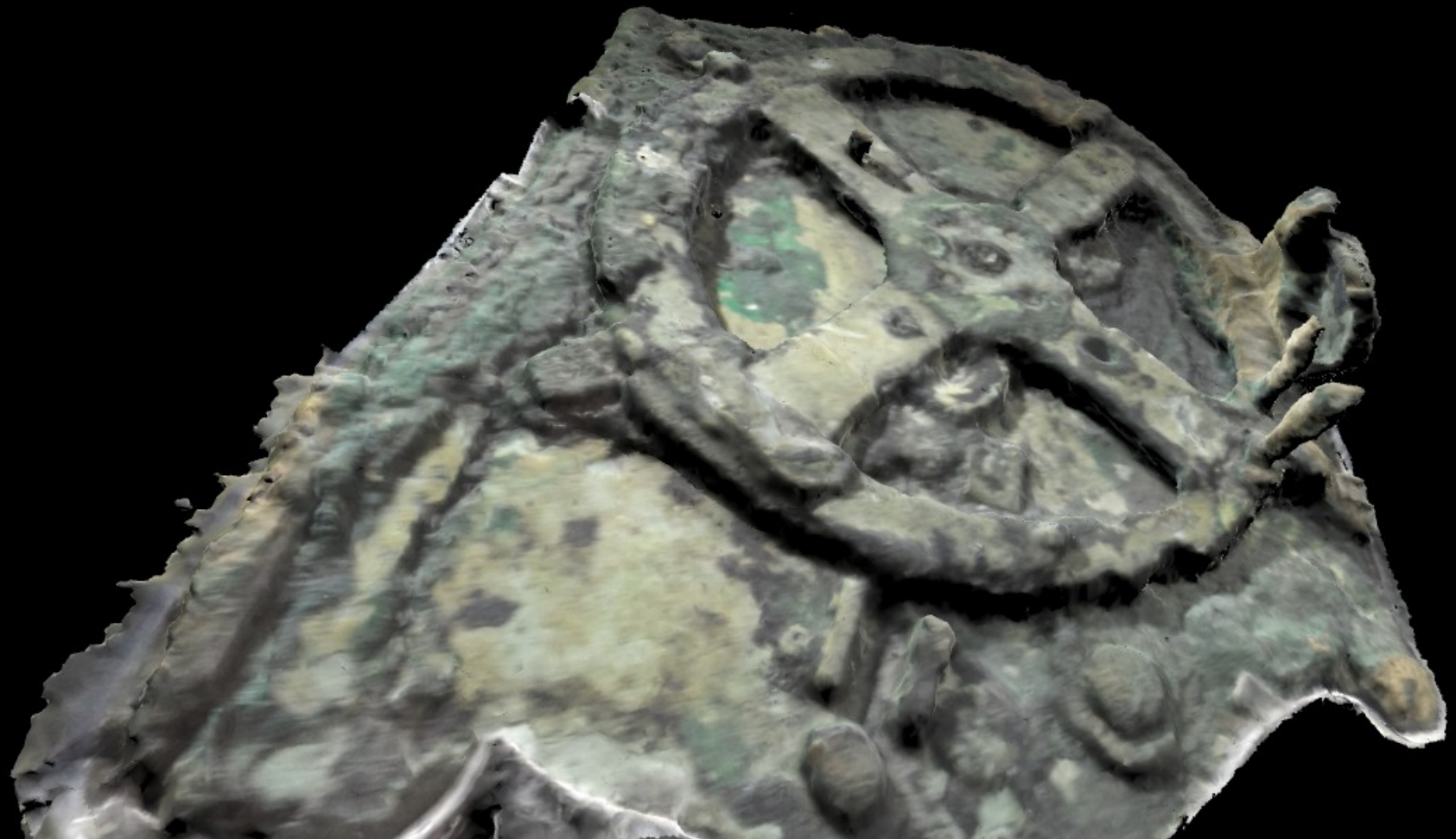
Projekt Meton

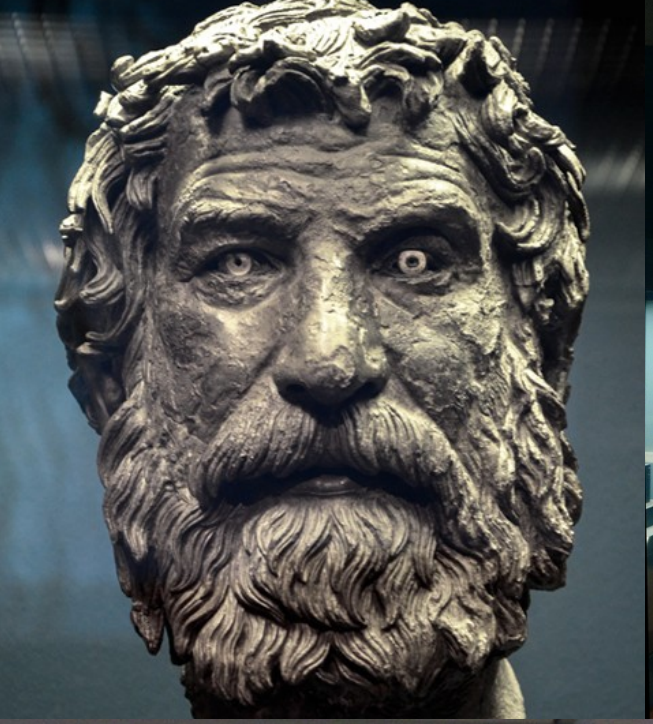
Einmal Antike retour,
einmal digital und zurück

Prof. Thomas Weibel, www.thomasweibel.ch

Bilden und forschen. graubünden


INDIANA JONES





Marcus Tullius Cicero: De natura deorum (45/44 v. Chr.)

«Quodsi in Scythiam aut in Britanniam sphaeram aliquis tulerit hanc quam nuper familiaris noster effecit Posidonius, cuius singulae conversiones idem efficiunt in sole et in luna et in quinque stellis errantibus quod efficitur in caelo singulis diebus et noctibus.»

«Nehmen wir an, ein Reisender bringt ein Planetarium nach Skythien oder Britannien, wie es unser Freund Poseidonius konstruiert hat, dessen einzelne Umdrehungen an Sonne, dem Mond und den fünf Planeten dasselbe bewirken, was sich am wirklichen in Tagen und Nächten abspielt.»

Our current knowledge of the **Antikythera Mechanism** [PDF] fsb.hr
JH Seiradakis, MG Edmunds - Nature Astronomy, 2018 - nature.com
... **Antikythera Mechanism** and an elementary geared Byzantine sundial 3 from around the late fifth or early sixth century bce. The **Antikythera Mechanism** ... 1), geared **mechanism**, made of ...
☆ Speichern 99 Zitieren Zitiert von: 45 Ähnliche Artikel Alle 5 Versionen Web of Science: 10 »

The **Antikythera mechanism** reconsidered [PDF] sagepub.com
MT Wright - Interdisciplinary science reviews, 2007 - journals.sagepub.com
... The considerable bulk of this '**Antikythera** treasure' included ... geared **mechanism**, was recognised only later. The first official description of what we now call the **Antikythera Mechanism** ...
☆ Speichern 99 Zitieren Zitiert von: 69 Ähnliche Artikel Alle 9 Versionen Web of Science: 21 »

Decoding the ancient Greek astronomical calculator known as the **Antikythera Mechanism** [PDF] shiftleft.com
T Freeth, Y Bitsakis, X Moussas, JH Seiradakis... - Nature, 2006 - nature.com
... The **Antikythera Mechanism** is a unique Greek geared device, ... shipwreck, the **Antikythera Mechanism** is technically more ... The **mechanism** predicted lunar and solar eclipses on the ...
☆ Speichern 99 Zitieren Zitiert von: 496 Ähnliche Artikel Alle 28 Versionen Web of Science: 175 »

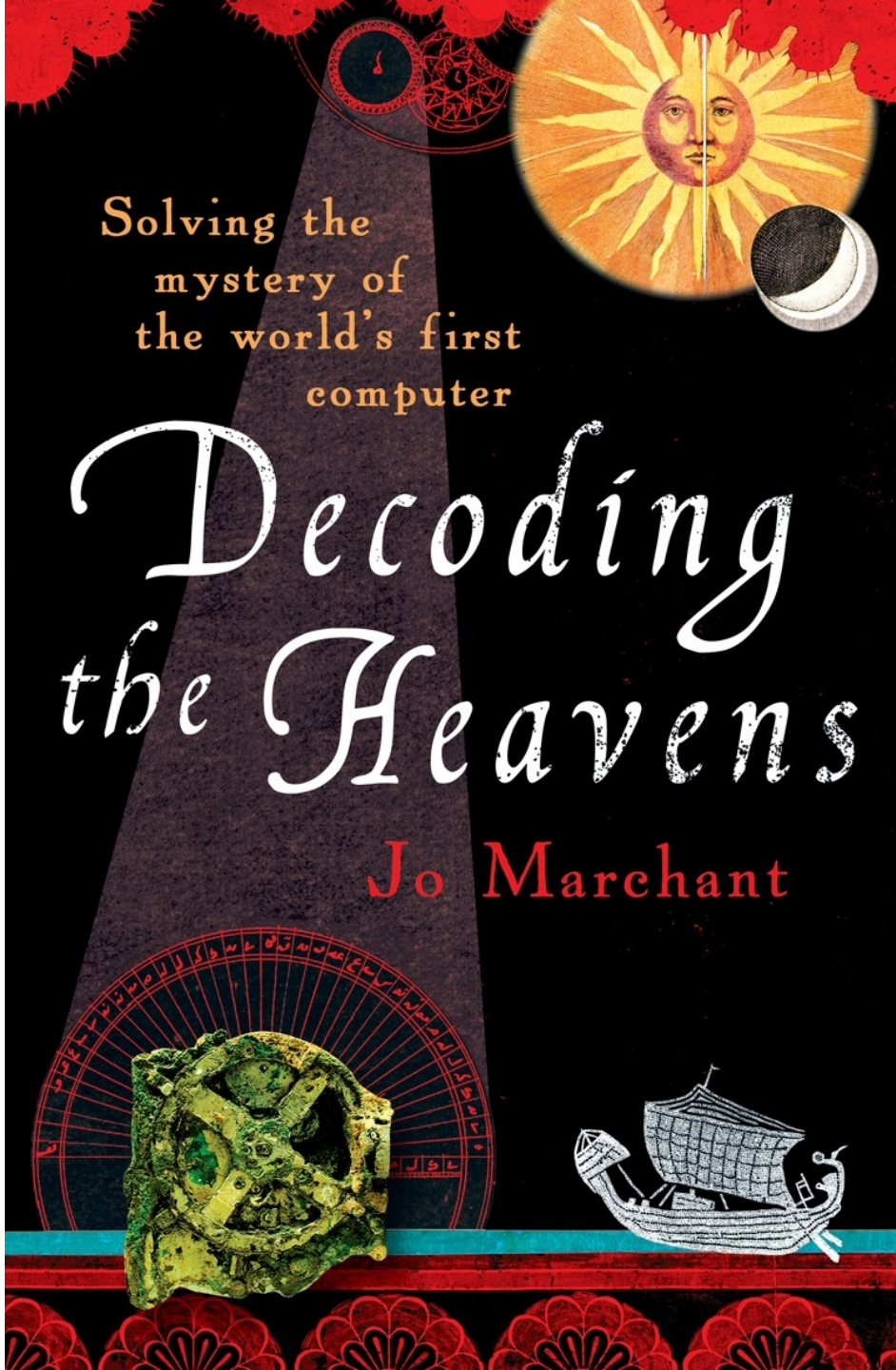
Gears from the Greeks. The **Antikythera mechanism**: a calendar computer from ca. 80 BC [PDF] jstor.org
D de Solla Price - Transactions of the American Philosophical Society, 1974 - JSTOR
... to appreciate the deep significance of the **Antikythera mechanism** which was known to me ... , I published a new evaluation of the **Antikythera mechanism** in an article, "Clockwork before ...
☆ Speichern 99 Zitieren Zitiert von: 363 Ähnliche Artikel Alle 7 Versionen Web of Science: 52 »

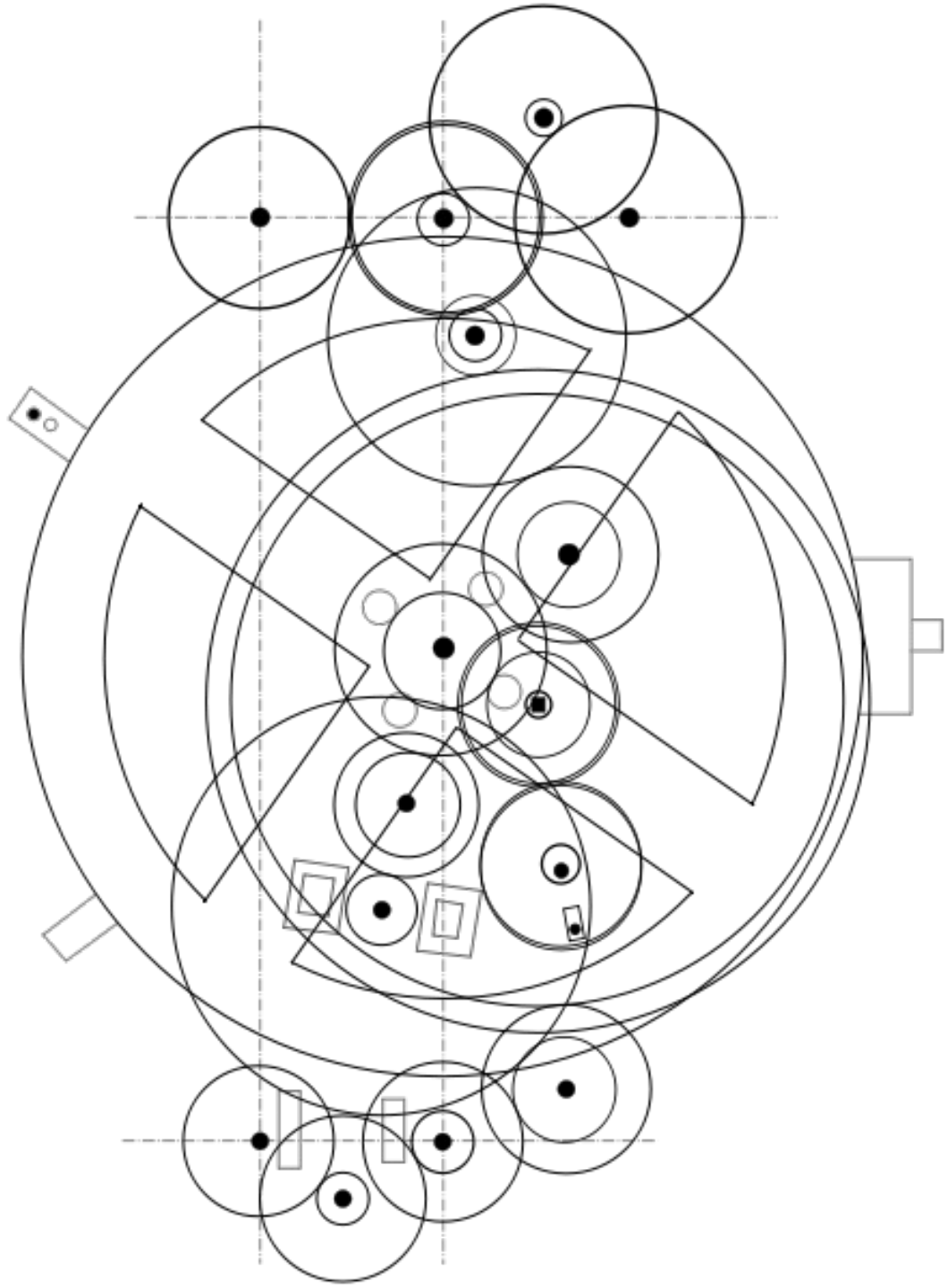
A Model of the Cosmos in the ancient Greek **Antikythera Mechanism** [PDF] nature.com
T Freeth, D Higgon, A Dacanalis, L MacDonald... - Scientific reports, 2021 - nature.com
... Here we propose that the **Antikythera Mechanism** itself calculated these synodic intervals by counting days on the Calendar Dial between synodic events indicated by the synodic scale ...
☆ Speichern 99 Zitieren Zitiert von: 58 Ähnliche Artikel Alle 21 Versionen Web of Science: 1 »

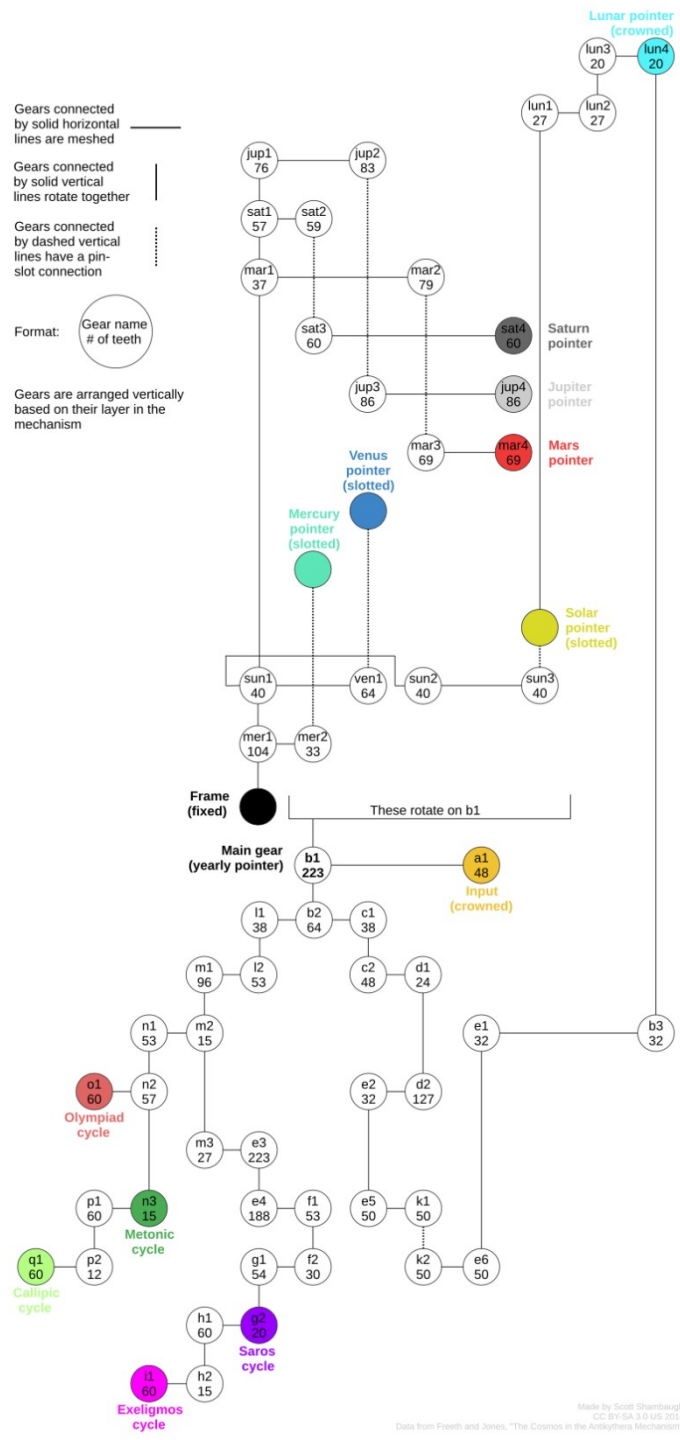
The **Antikythera mechanism** and the mechanical universe [PDF] tandfonline.com Full View
MG Edmunds - Contemporary physics, 2014 - Taylor & Francis
... based around the **Antikythera Mechanism**, an artefact from ... BC as witnessed by the **Antikythera Mechanism** comes as a great ... and functions of the **Antikythera Mechanism** are described. ...
☆ Speichern 99 Zitieren Zitiert von: 22 Ähnliche Artikel Alle 6 Versionen Web of Science: 9 »

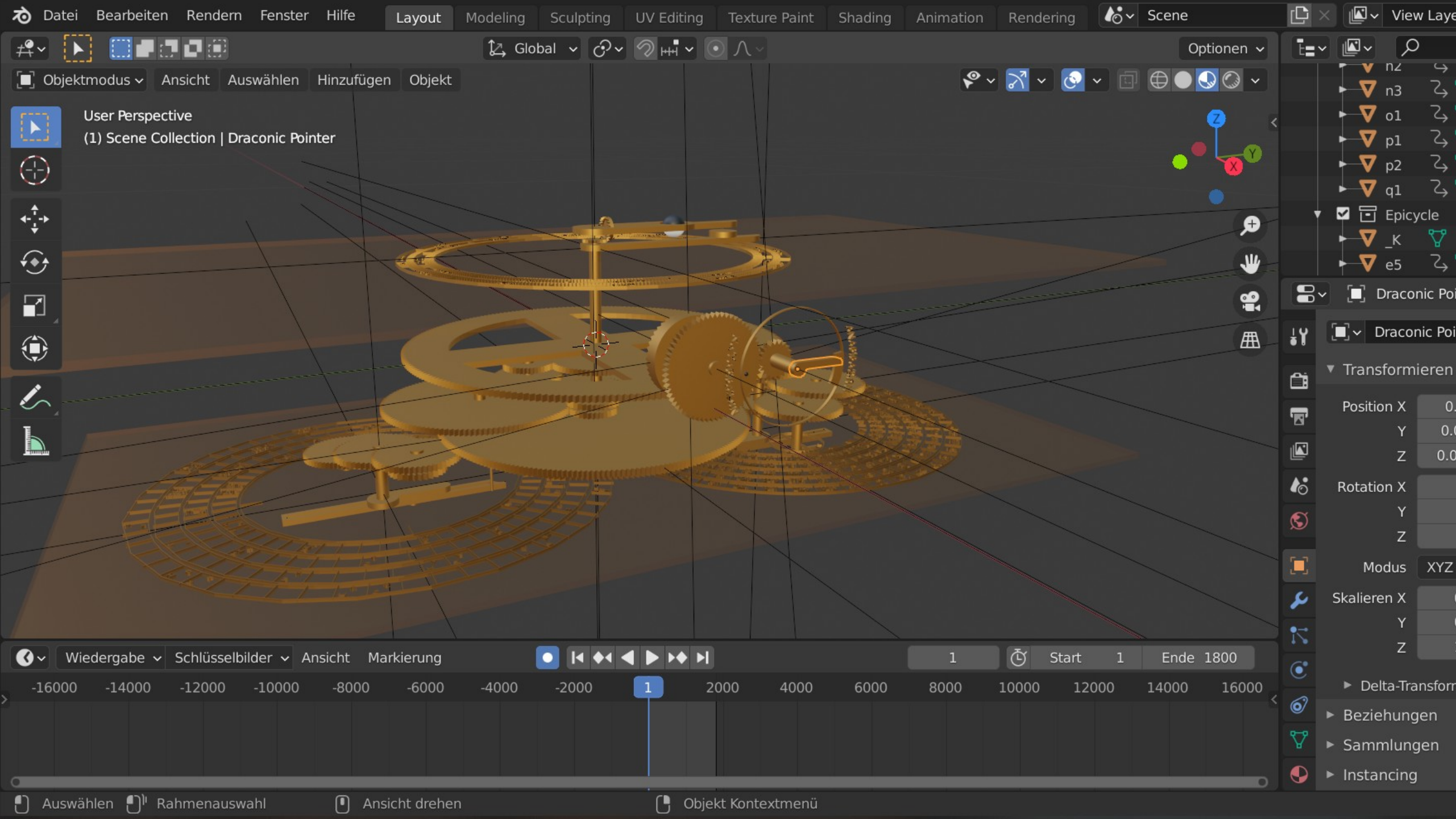
[PDF] The **Antikythera mechanism**: a new gearing scheme [PDF] online.fr
MT Wright - Bulletin of the Scientific Instrument Society, 2005 - fsoso.online.fr
The **Antikythera Mechanism**, the oldest geared instrument in the world, became widely known through the work of Professor Derek de Solla Price; and for anyone seriously interested in ...
☆ Speichern 99 Zitieren Zitiert von: 61 Ähnliche Artikel Alle 4 Versionen »

[PDF] Understanding the **Antikythera mechanism** [PDF] free.fr
MT Wright - ... Second International Conference on Ancient Greek ..., 2006 - hist.science.free.fr
... The fragmentary **Antikythera Mechanism**, recovered from a shipwreck that is dateable ... **Mechanism** remained but poorly understood. A new reconstruction of the **Antikythera Mechanism** ...
☆ Speichern 99 Zitieren Zitiert von: 24 Ähnliche Artikel Alle 2 Versionen »






Gears connected by solid horizontal lines are meshed
Gears connected by solid vertical lines rotate together
Gears connected by dashed vertical lines have a pin-slot connection
Format: Gear name # of teeth
Gears are arranged vertically based on their layer in the mechanism
Lunar pointer (crowned)
lun3 20
lun4 20
lun1 27
lun2 27
jup1 76
jup2 83
sat1 57
sat2 59
mar1 37
mar2 79
sat3 60
sat4 60
Saturn pointer
jup3 86
jup4 86
Jupiter pointer
mar3 69
mar4 69
Mars pointer
Venus pointer (slotted)
Mercury pointer (slotted)
Solar pointer (slotted)
sun1 40
ven1 64
sun2 40
sun3 40
mer1 104
mer2 33
Frame (fixed)
These rotate on b1
Main gear (yearly pointer)
b1 223
a1 48
Input (crowned)
l1 38
b2 64
c1 38
m1 96
l2 53
c2 48
d1 24
n1 53
m2 15
e1 32
b3 32
o1 60
Olympiad cycle
n2 57
e2 32
d2 127
m3 27
e3 223
p1 60
n3 15
Metonic cycle
e4 188
f1 53
e5 50
k1 50
q1 60
Callipic cycle
p2 12
g1 54
f2 30
k2 50
e6 50
h1 60
g2 20
Saros cycle
i1 60
Exeligmos cycle
h2 15
Made by Scott Shambaugh
CC BY-SA 3.0 US 2014
Data from Freeth and Jones, "The Cosmos in the Antikythera Mechanism"


Datei
Bearbeiten
Rendern
Fenster
Hilfe
Layout
Modeling
Sculpting
UV Editing
Texture Paint
Shading
Animation
Rendering
Scene
View Laye
Global
Optionen
Objektmodus
Ansicht
Auswählen
Hinzufügen
Objekt
User Perspective
(1) Scene Collection | Draconic Pointer
n2
n3
o1
p1
p2
q1
Epicycle
_K
e5
Draconic Poi
Transformieren
Position X
Y
Z
Rotation X
Y
Z
Modus
XYZ
Skalieren X
Y
Z
Delta-Transform
Beziehungen
Sammlungen
Instancing
Wiedergabe
Schlüsselbilder
Ansicht
Markierung
1
Start 1
Ende 1800
-16000
-14000
-12000
-10000
-8000
-6000
-4000
-2000
1
2000
4000
6000
8000
10000
12000
14000
16000
Auswählen
Rahmenauswahl
Ansicht drehen
Objekt Kontextmenü

the
antikythera
mechanism

thomasweibel.ch/antikythera

Letzter Vollmond 2006
5. Dezember

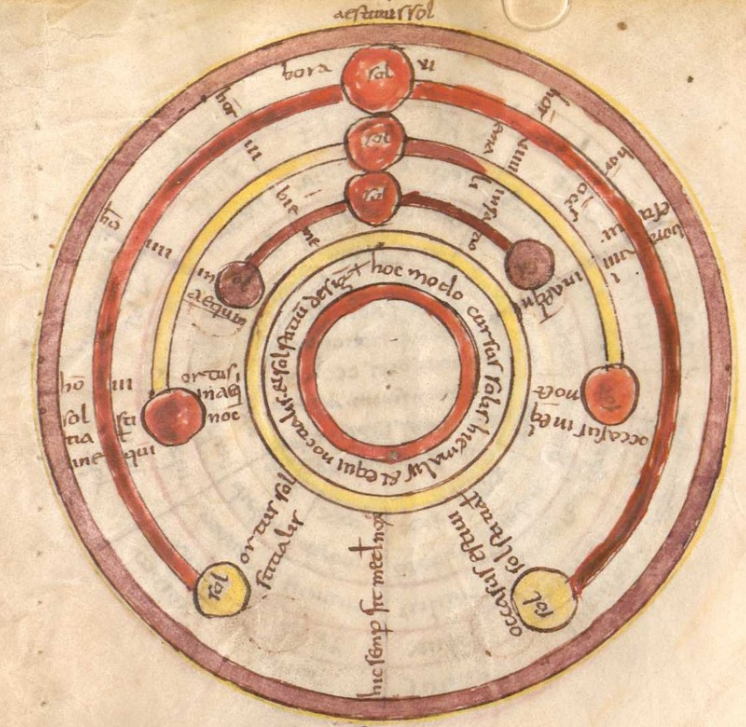
19 Jahre

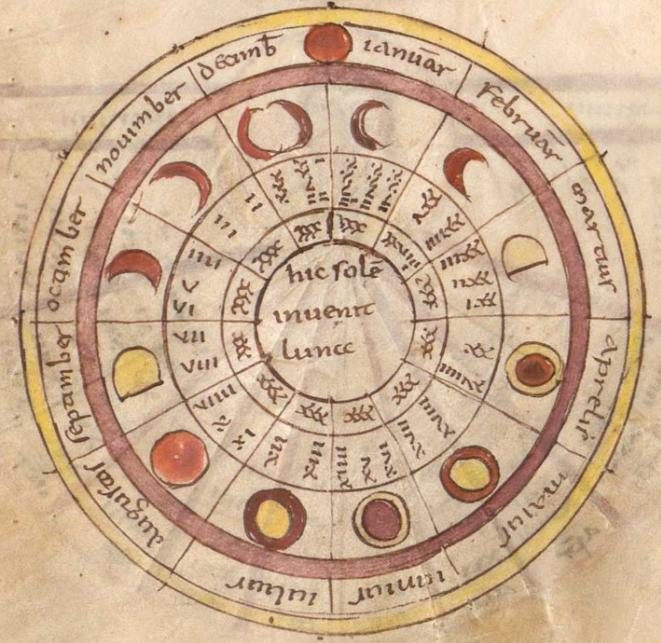
Letzter Vollmond 2025
5. Dezember

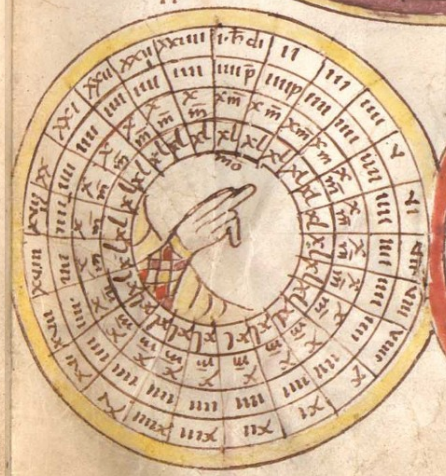
19 Jahre

Letzter Vollmond 2044
5. Dezember

19 Sonnenjahre ≈
235 Mondphasen


hoc modo cursus solis


hic solē
inuenit
lunce
ianuar
februar
martius
aprel
maius
iunius
iulius
augustus
septembr
octobr
nouembr
decembr




CALENDARIUM PERPETUUM.
Literæ Dom.
Pascha.
Pentecost.
Lit. Dom.
Bissextus
Epact.
Mar. Maj.

$$
\begin{aligned}
a &= J \mod 4 \\
b &= J \mod 7 \\
c &= J \mod 19 \\
d &= (19c + M) \mod 30 \\
e &= (2a + 4b + 6d + N) \mod 7 \\
f &= \lfloor (c + 11d + 22e)/451 \rfloor \\
Ostern &= 22 + d + e - 7f
\end{aligned}
$$

```
gauss_computus_paschalis :
    input( year, calendar )

    a = year % 19
    b = year % 4
    c = year % 7

    if calendar is GREGORIAN :
        k = floor( year / 100 )
        p = floor( (13 + 8*k) / 25 )
        q = floor( k / 4 )
        M = (15 - p + k - q) % 30
        N = (4 + k - q) % 7
    else if calendar is JULIAN :
        M = 15
        N = 6

    d = ( 19*a + M ) % 30
    e = ( 2*b + 4*c + 6*d + N ) % 7
    march_easter = 22 + d + e
    april_easter = d + e - 9

    if april_easter == 25 AND
       d == 28 AND
       e == 6 AND
       (11*M + 11) % 30 < 19 :
       april_easter = 18

    if april_easter == 26 AND
       d == 29 AND
       e == 6 :
       april_easter = 19

    if march_easter ≤ 31 : output( 3, march_easter )
    else : output( 4, april_easter )
```

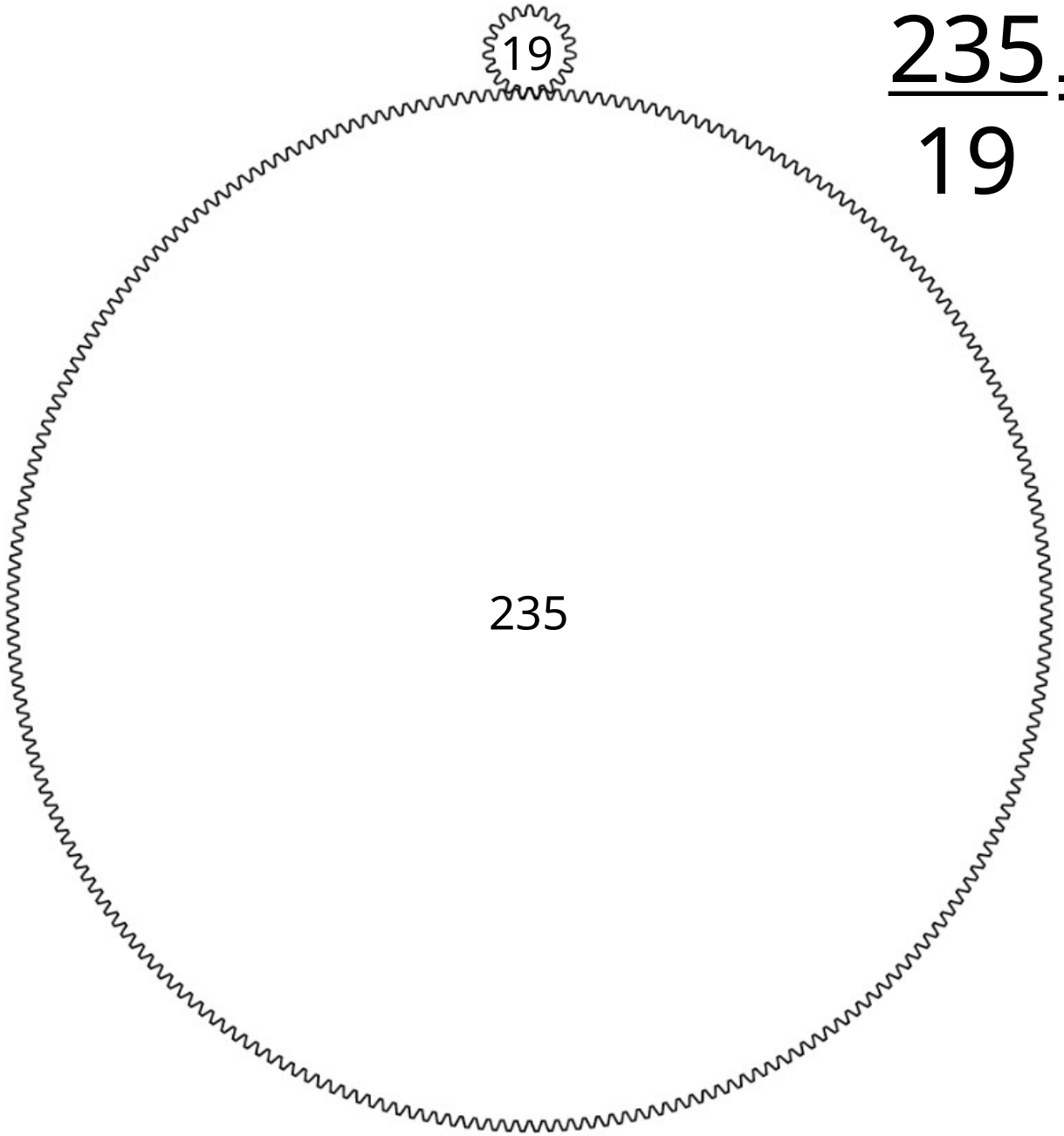
Osterregel

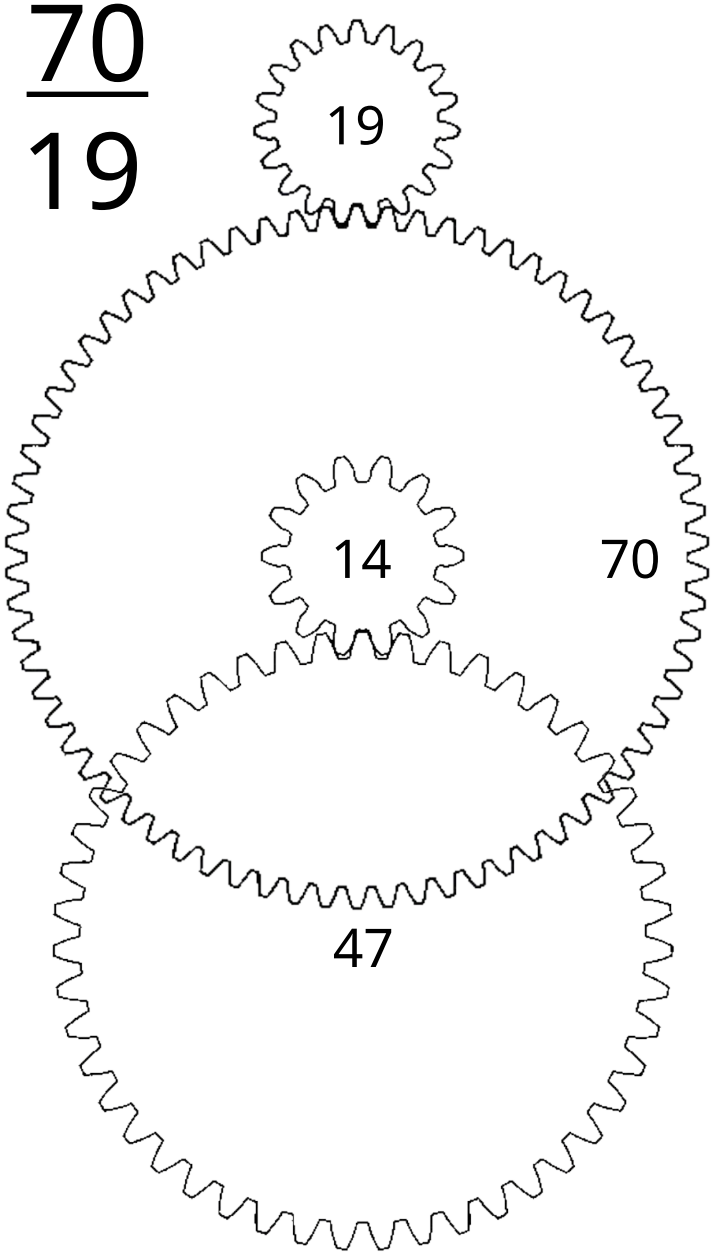
- Ostersonntag ist der Sonntag nach dem ersten Vollmond nach dem 21. März (Frühlingsanfang).
- Fällt dieser Vollmond selbst auf einen Sonntag, ist Ostern eine Woche später.

Erster Vollmond nach dem 21. März 2026:
Donnerstag, 2. April.

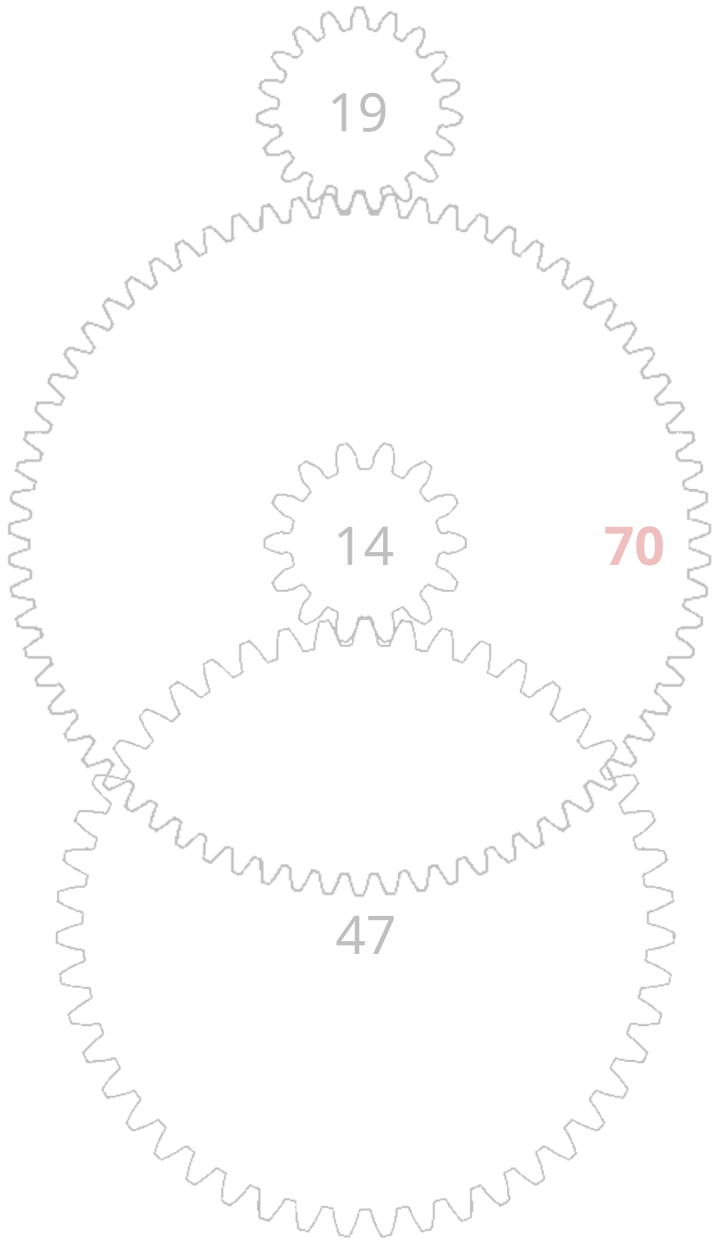
Ostern 2026 ist also am Sonntag, 5. April.

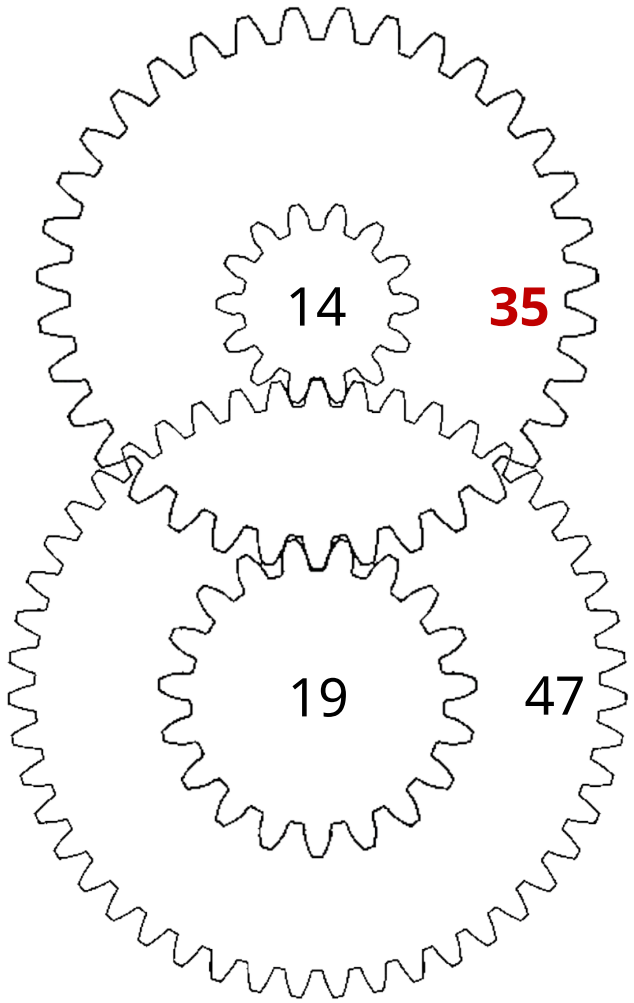
$$\frac{235}{19} = \frac{47}{14} \times \frac{70}{19}$$





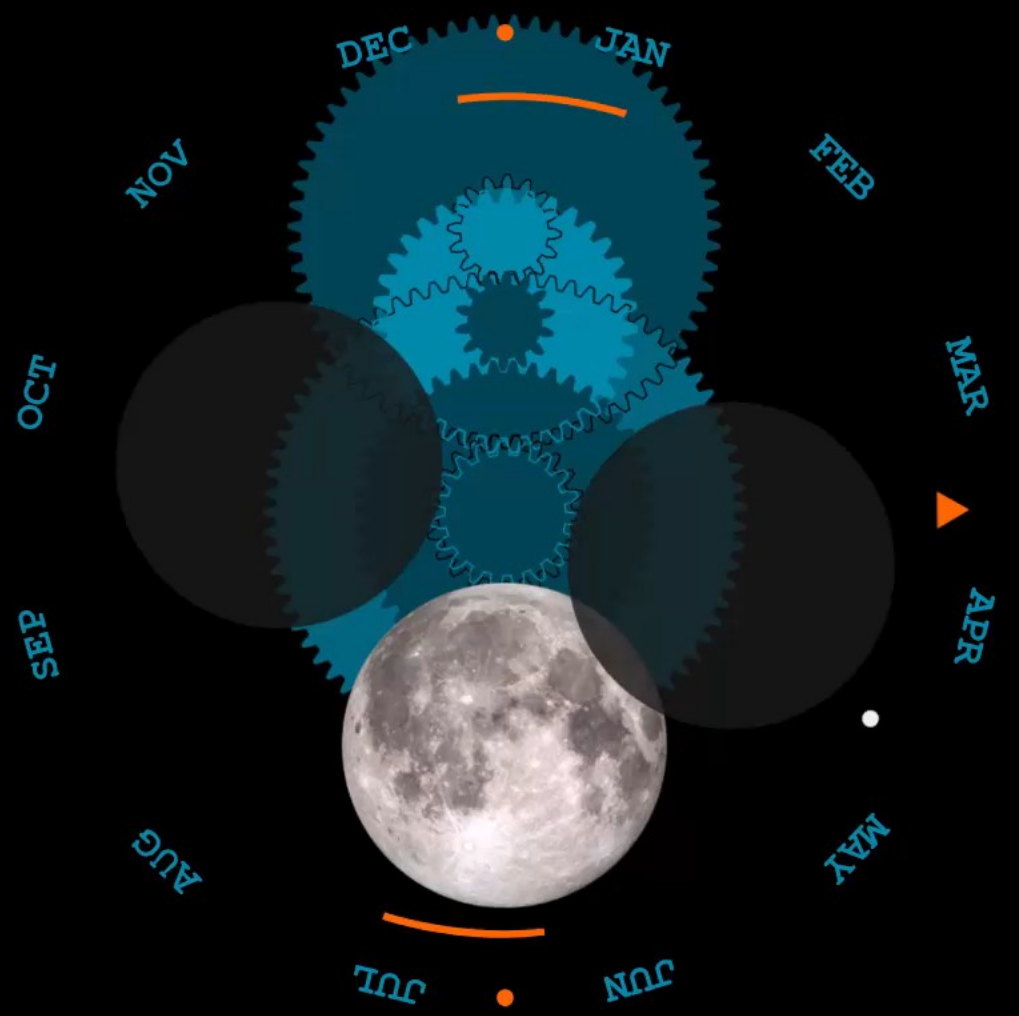

NEW
FIRST Q
FULL
LAST Q
NEW
29½
25
20


19
14
70
47


14
35
19
47

meton

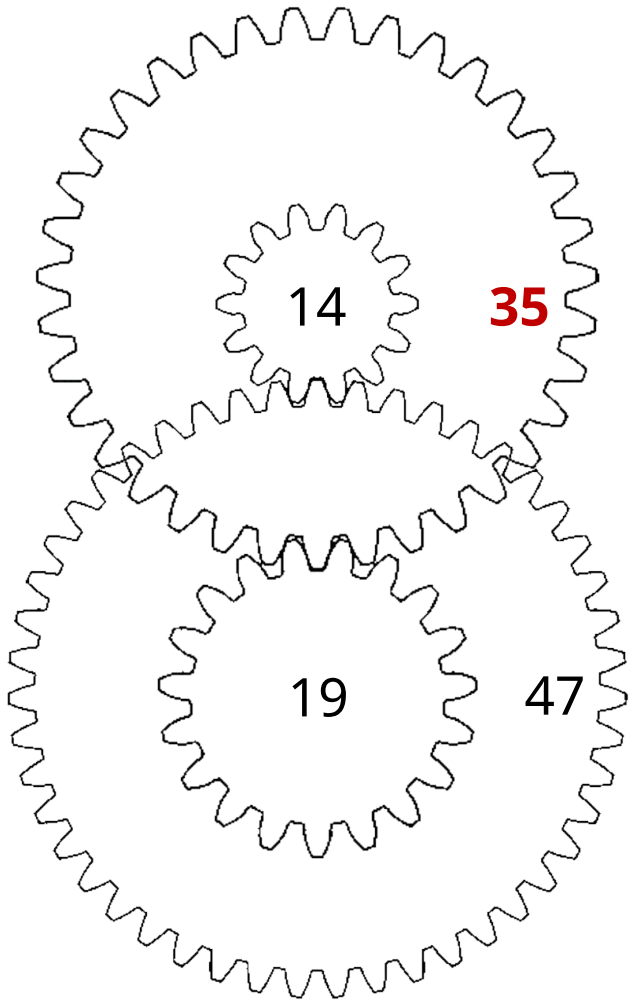
virtual mechanical moon
and eclipse calculator



animate

current

```
const cal=[since,since,-since*47/
14,-since*47/14,-since*47/14,since
*47/14*35/19,since*47/14*35/19+
corrSyn];
```



meton

virtual mechanical moon
and eclipse calculator

animate

current

meton

virtual mechanical moon
and eclipse calculator

animate

current

thomasweibel.ch/meton

the
antikythera
mechanism

Marcus Tullius Cicero: De re publica I (54-51 v. Chr.)

«Hoc autem sphaerae genus, in quo solis et lunae motus inessent et earum quinque stellarum quae errantes et quasi vagae nominarentur, in illa sphaera solida non potuisse finiri, atque in eo admirandum esse inventum Archimedi, quod excogitasset quem ad modum in dissimillimis motibus inaequabiles et varios cursus servaret una conversio.»

«Diese Art von Globus, auf dem die Bewegungen der Sonne und des Mondes und der fünf Planeten, die Wanderer genannt werden, umfasste mehr, als auf dem festen Globus gezeigt werden konnte. Die Erfindung des Archimedes verdiente besondere Bewunderung, weil er einen Weg gefunden hatte, durch eine einzige Drehung des Globus diese verschiedenen Bewegungen mit ihren unterschiedlichen Geschwindigkeiten darzustellen.»

* meton36 - FreeCAD 1.0.0

Datei Bearbeiten Ansicht Werkzeuge Makro Skizze Part Design Fenster Hilfe

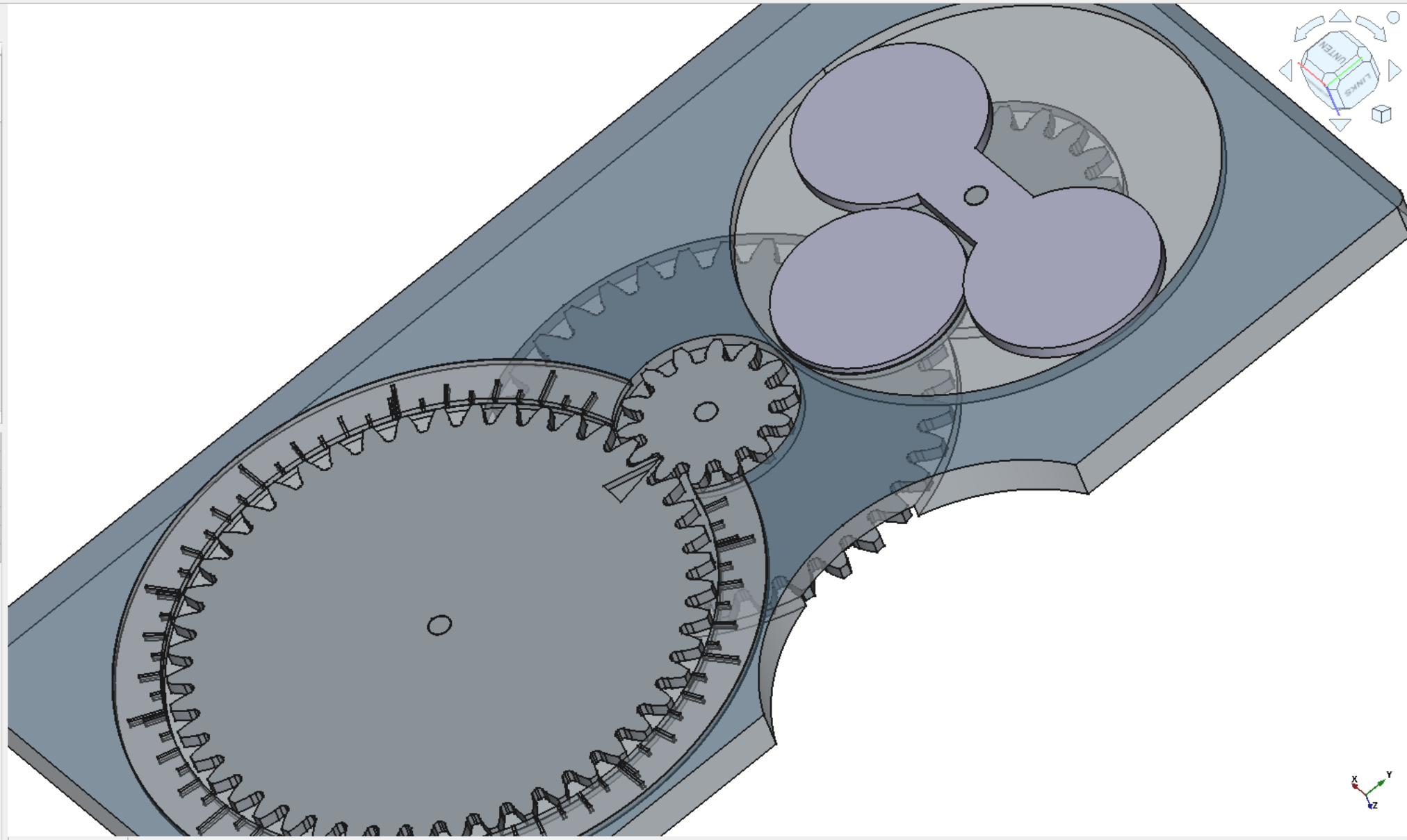
Part Design

Modell Aufgaben

Modell

- meton36
  - Fusion
  - Fusion003
  - Cut016
  - Körper024
  - Cut023
  - Cut025
  - Fusion005
  - Fusion006
  - Cut026
  - Cut030
    - Cut029
    - Compound003
      - Körper112
        - Ursprung112
        - Box075
      - Körper081
        - Ursprung081
        - Box044
      - Körper082
        - Ursprung082
        - Box045
      - Körper083

Basis	
Basis	Cut019
Tool	Body078 (Körper078)
Placement	[(0.00 0.00 1.00); 0.00 °; (0.00 mm 0.00 mm 0.00 mm)]
Label	Cut026
Boolean	
Refine	true

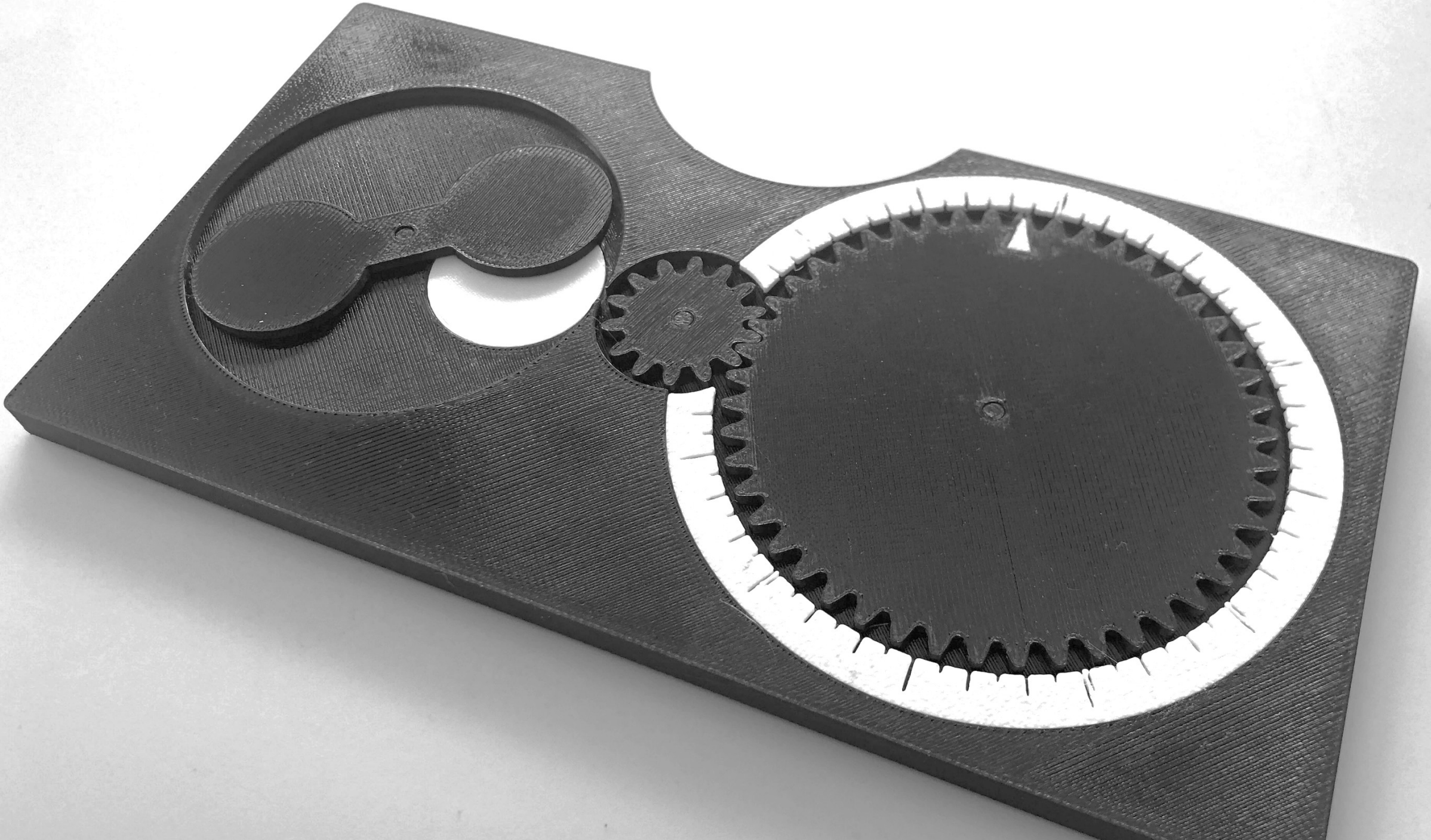


Ansicht Daten

meton36 : 1*

Preselected: meton36.Cut025.Face4 (4.06 mm, -1.25 mm, -1.00 mm)

Area: 65.25 cm^2 CAD 183.83 mm x 109.40 mm



Geany

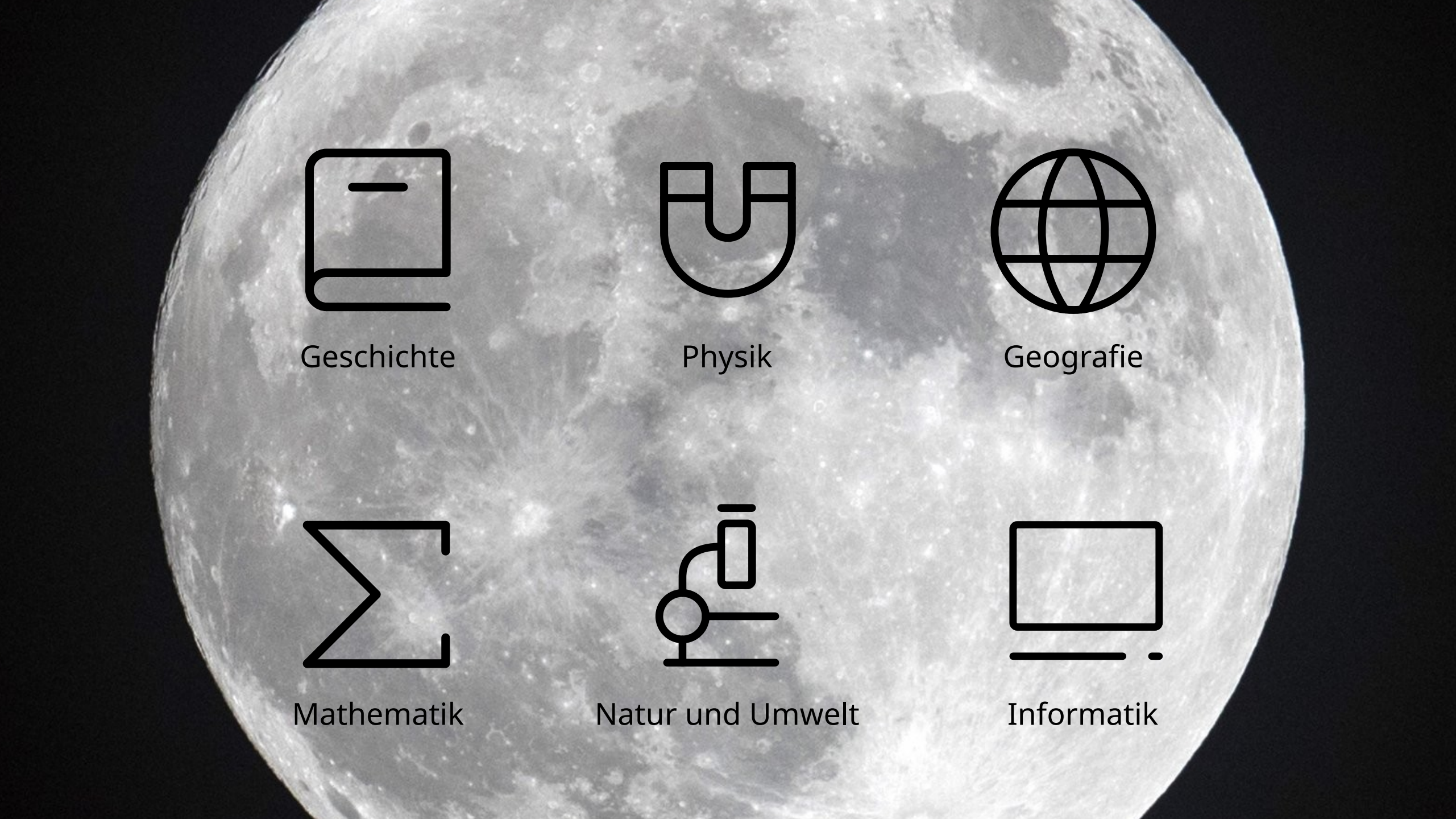
Inkscape

Gimp

Libre Office Calc

Blender

FreeCAD


Geschichte
Physik
Geografie
Mathematik
Natur und Umwelt
Informatik

meton

virtual mechanical moon
and eclipse calculator

animate

current

thomasweibel.ch/meton