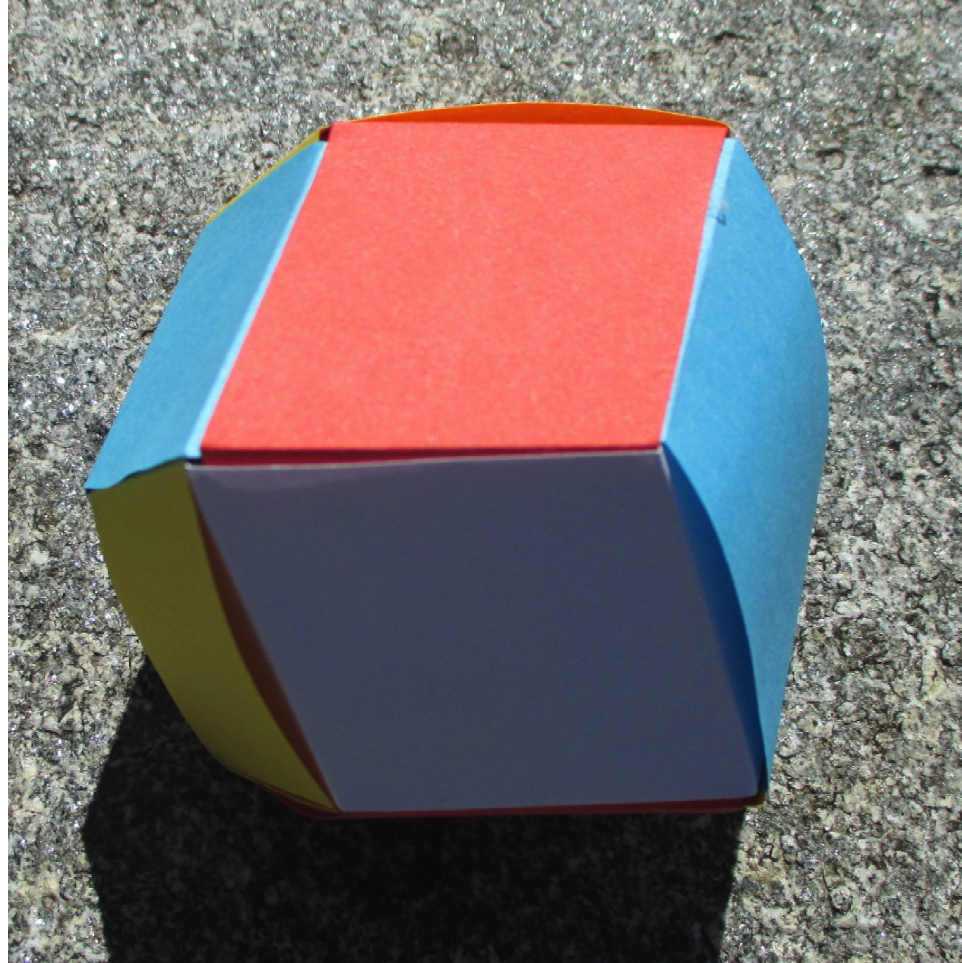


Hans Walser: Rhombendodekaeder



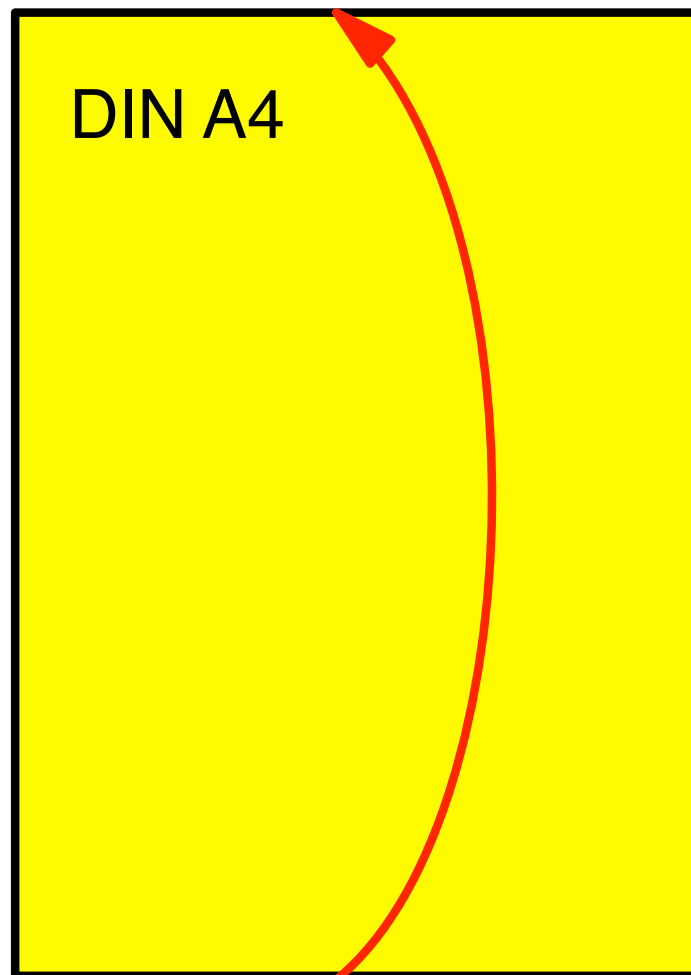
www.walser-h-m.ch/hans/Vortraege/20220407

Faltprozedur

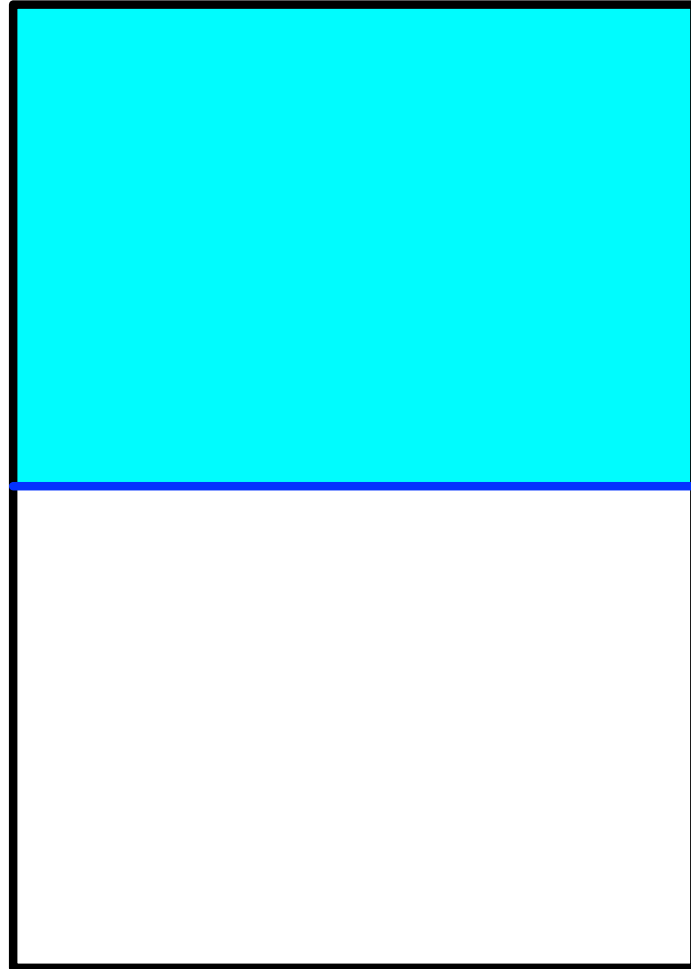
DIN A4



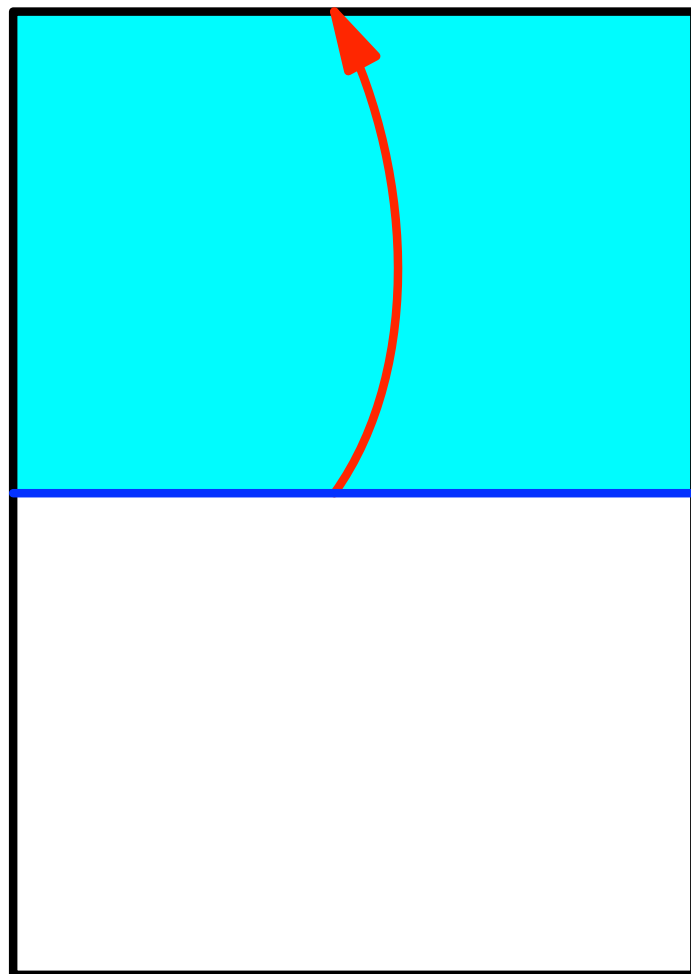
Faltprozedur



Faltprozedur



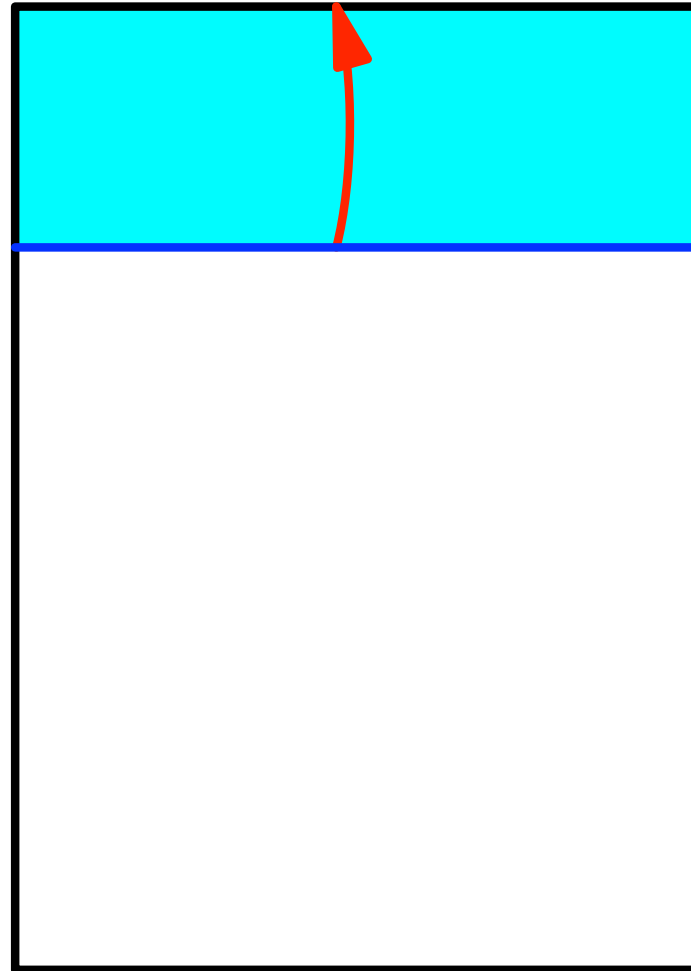
Faltprozedur



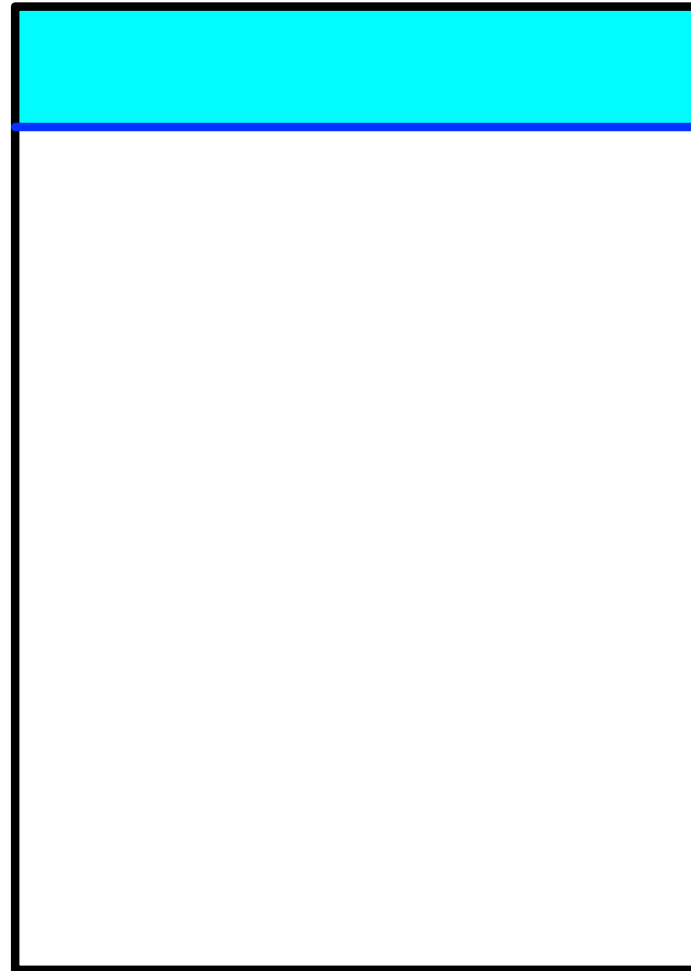
Faltprozedur



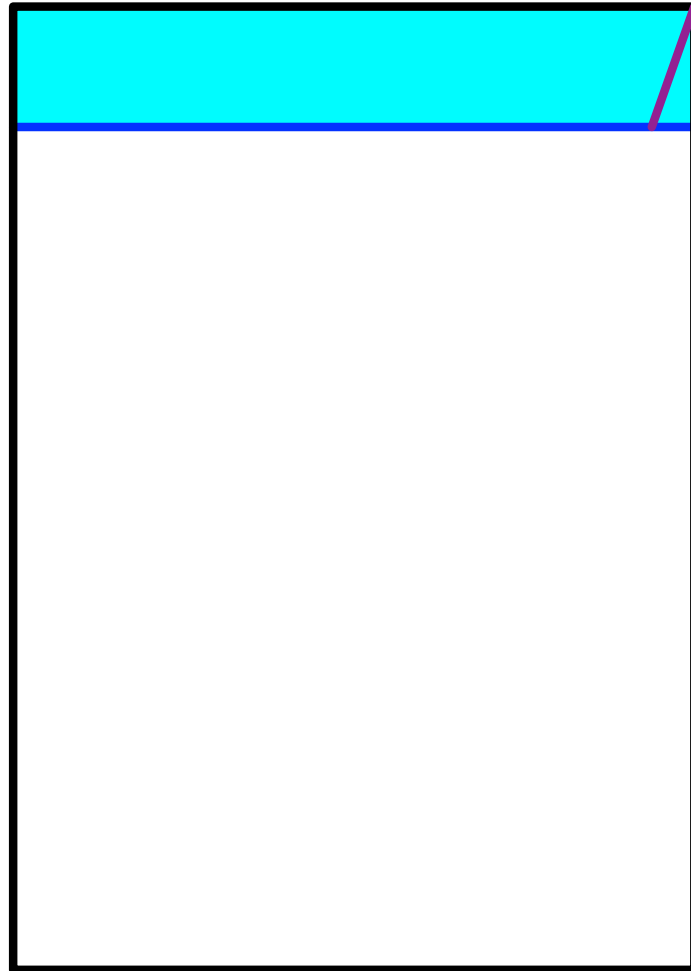
Faltprozedur



Faltprozedur



Markieren

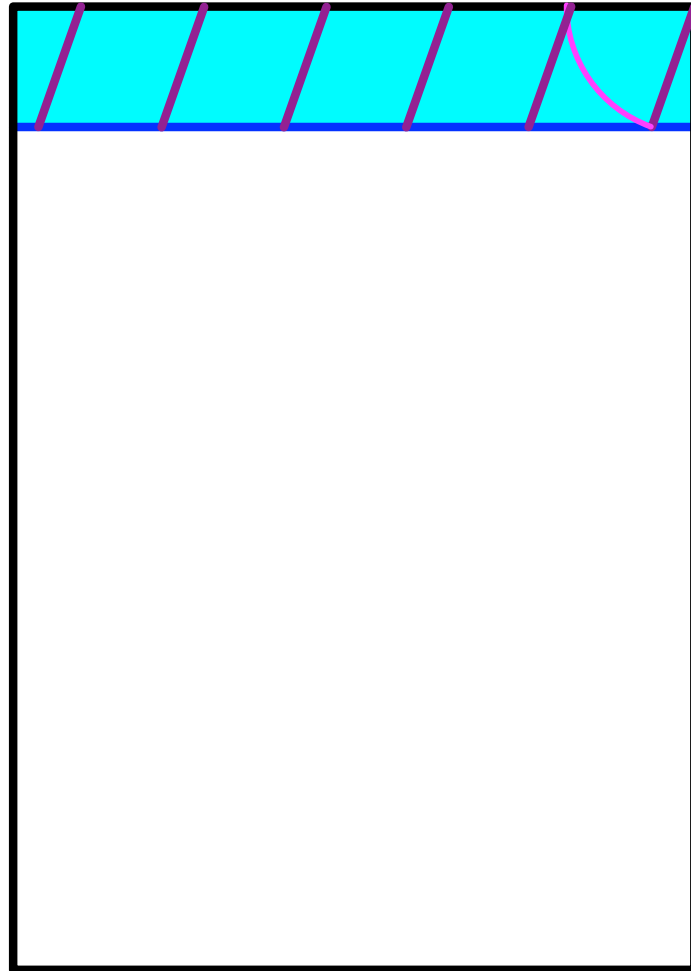


Markieren

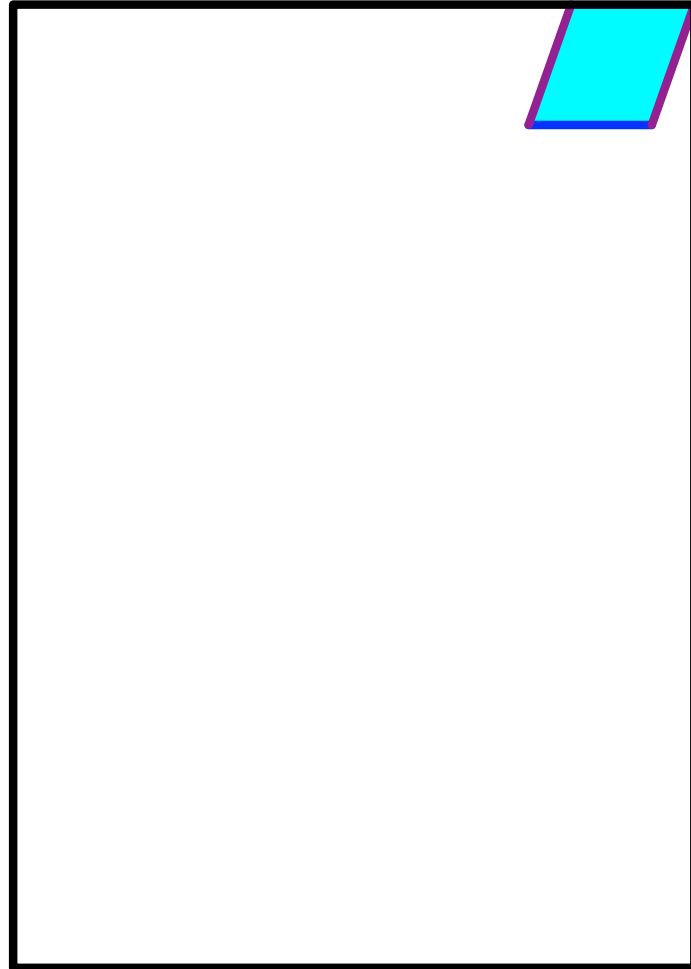
Winkel ca. 70.5°

$$\arccos\left(\frac{1}{3}\right) \approx 70.5288^\circ$$

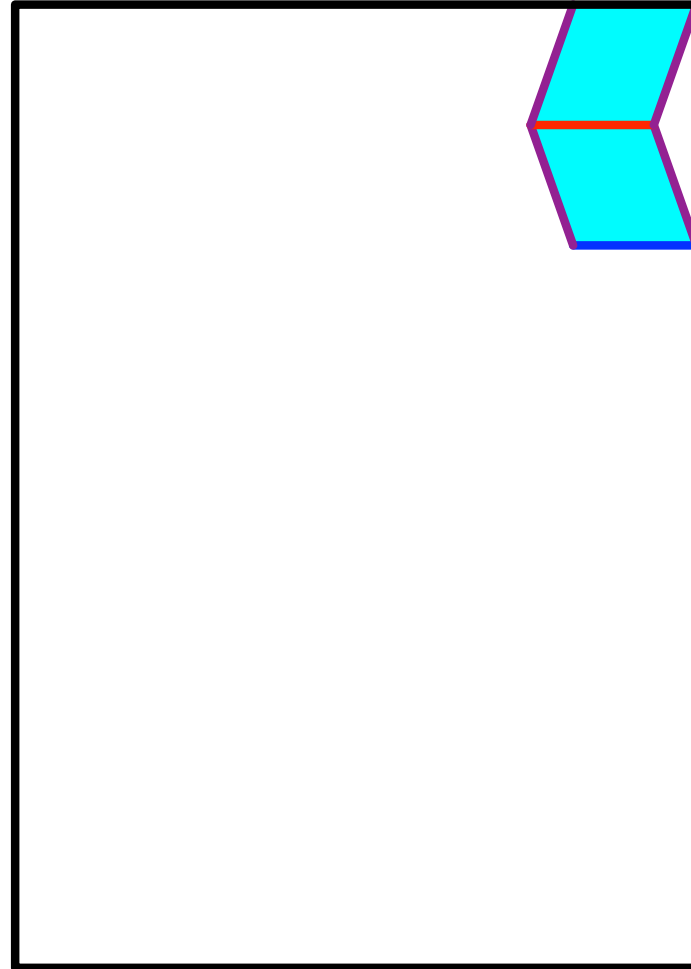
Markieren



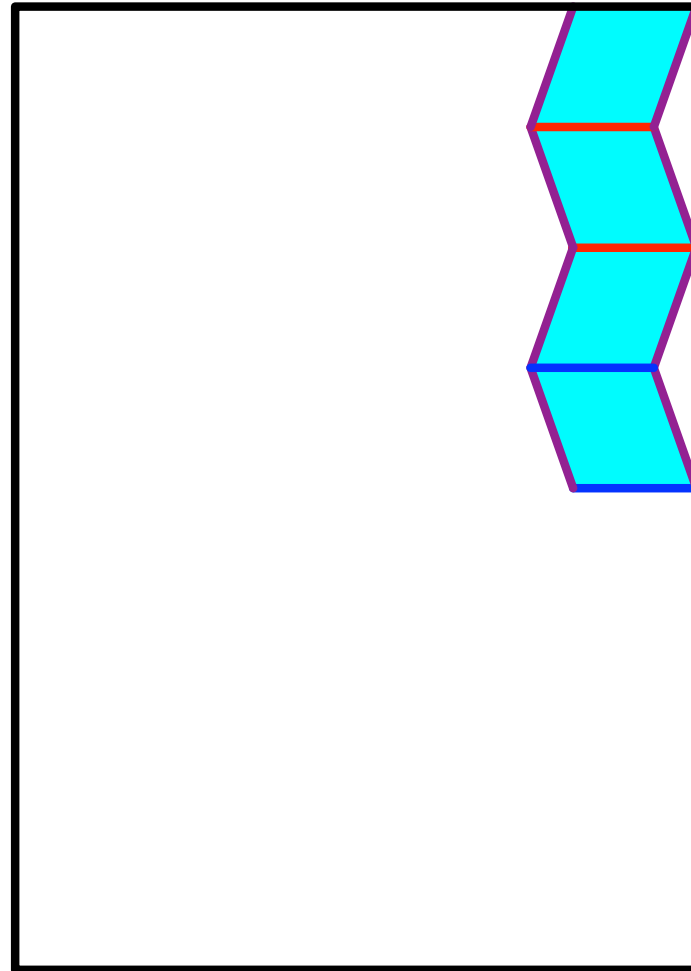
Schneiden



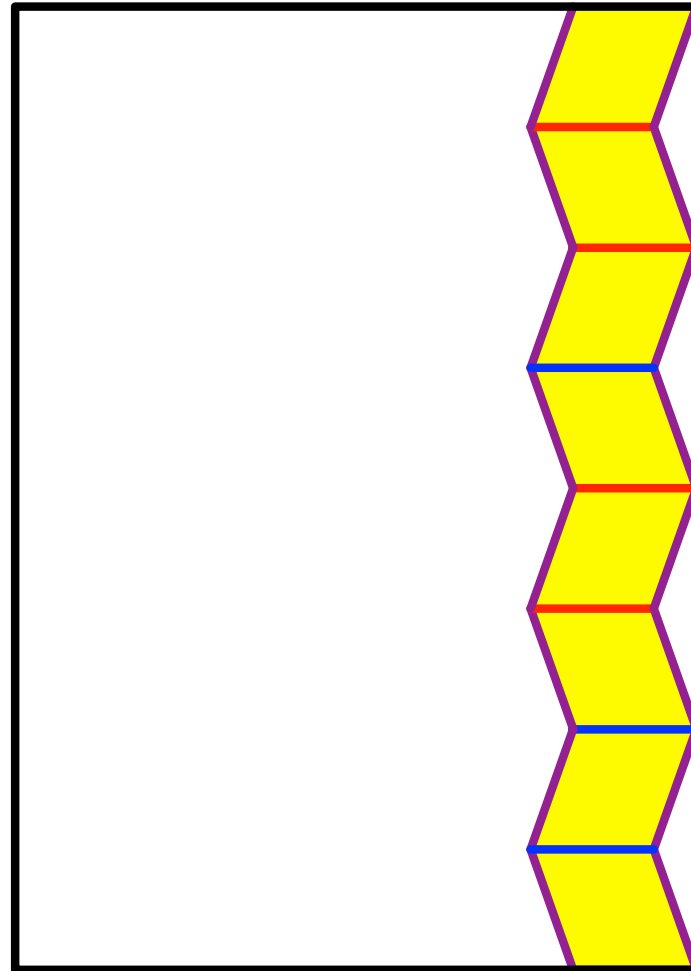
Auffalten



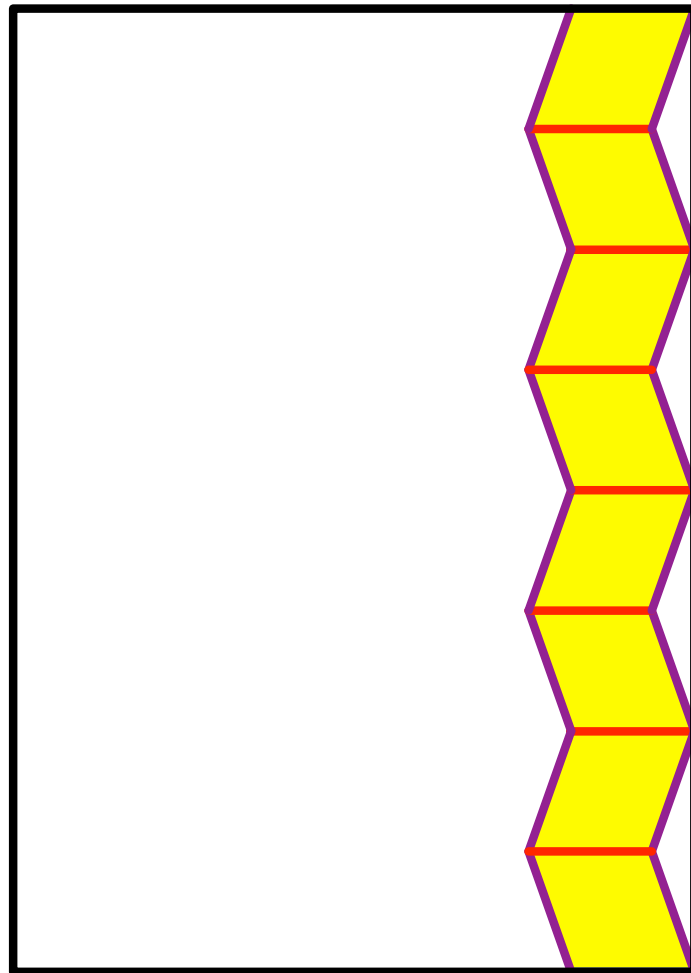
Auffalten



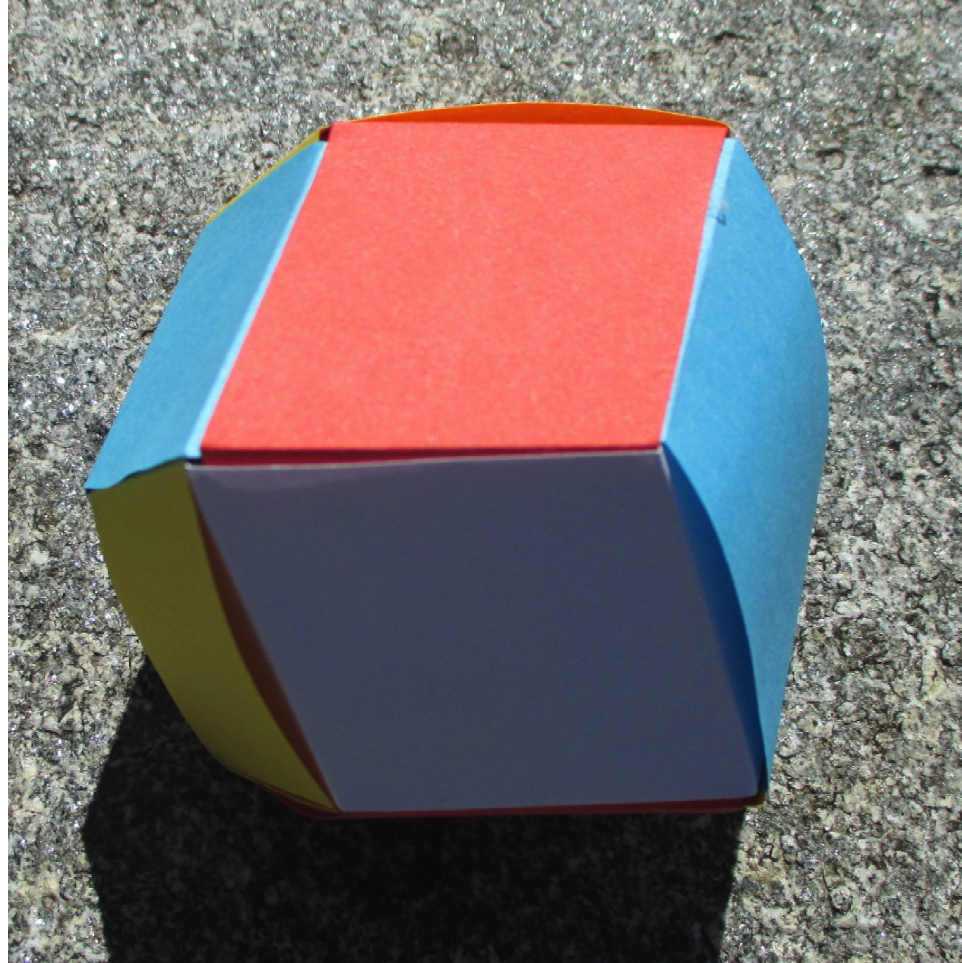
Auffalten



Umfalten



4 Zickzackstreifen



Das Rhombendodekaeder ist ein Raumfüller

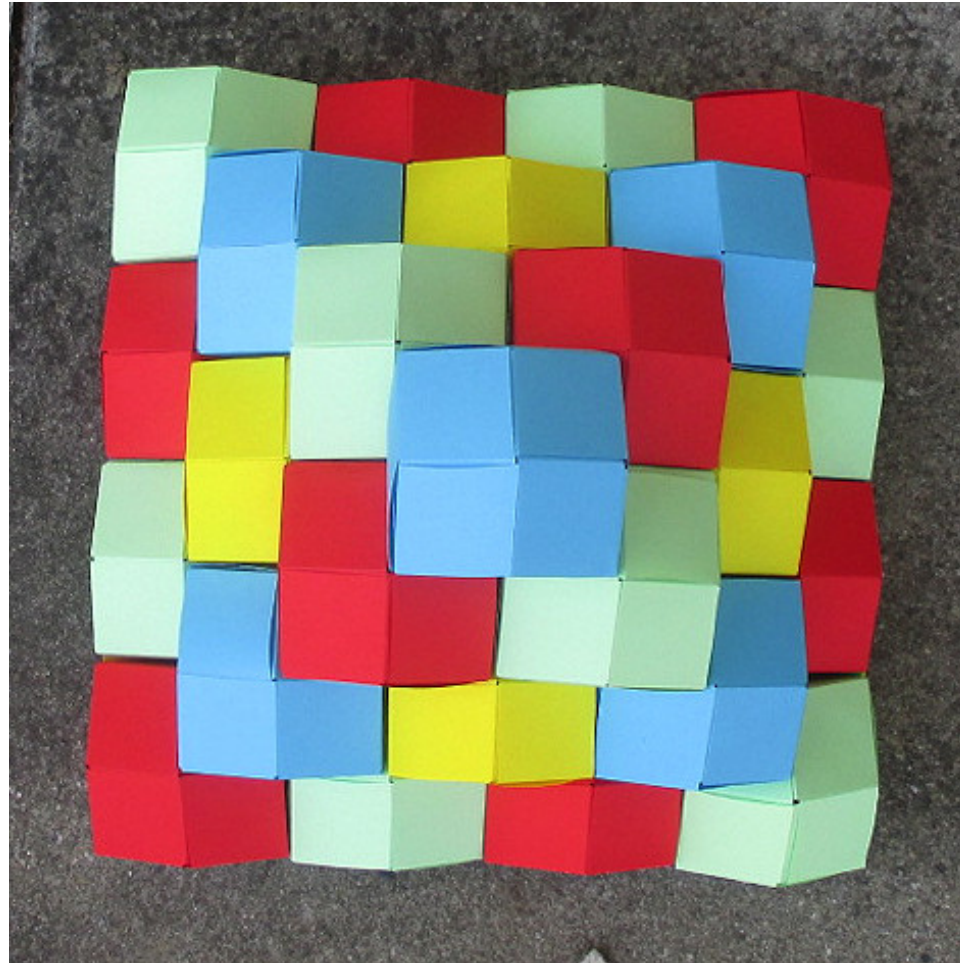


Das Rhombendodekaeder ist ein Raumfüller



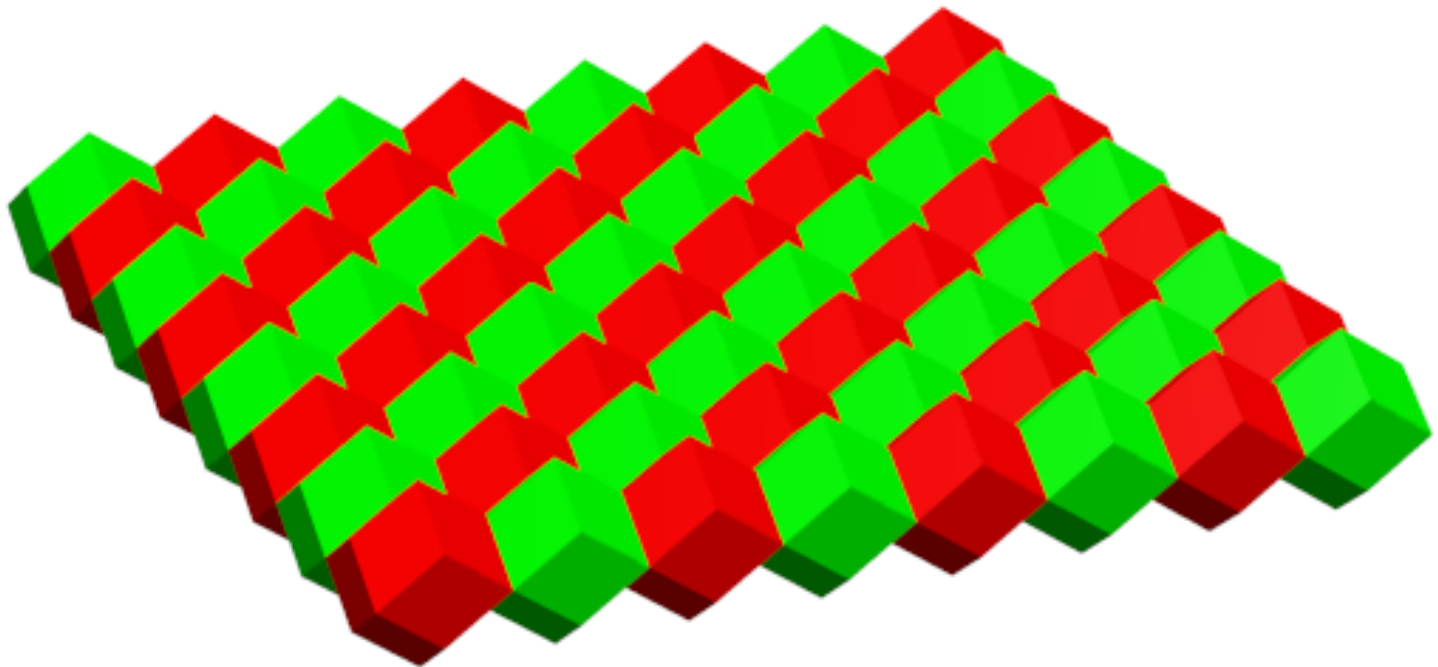
Oben 4 spitze Winkel

Das Rhombendodekaeder ist ein Raumfüller



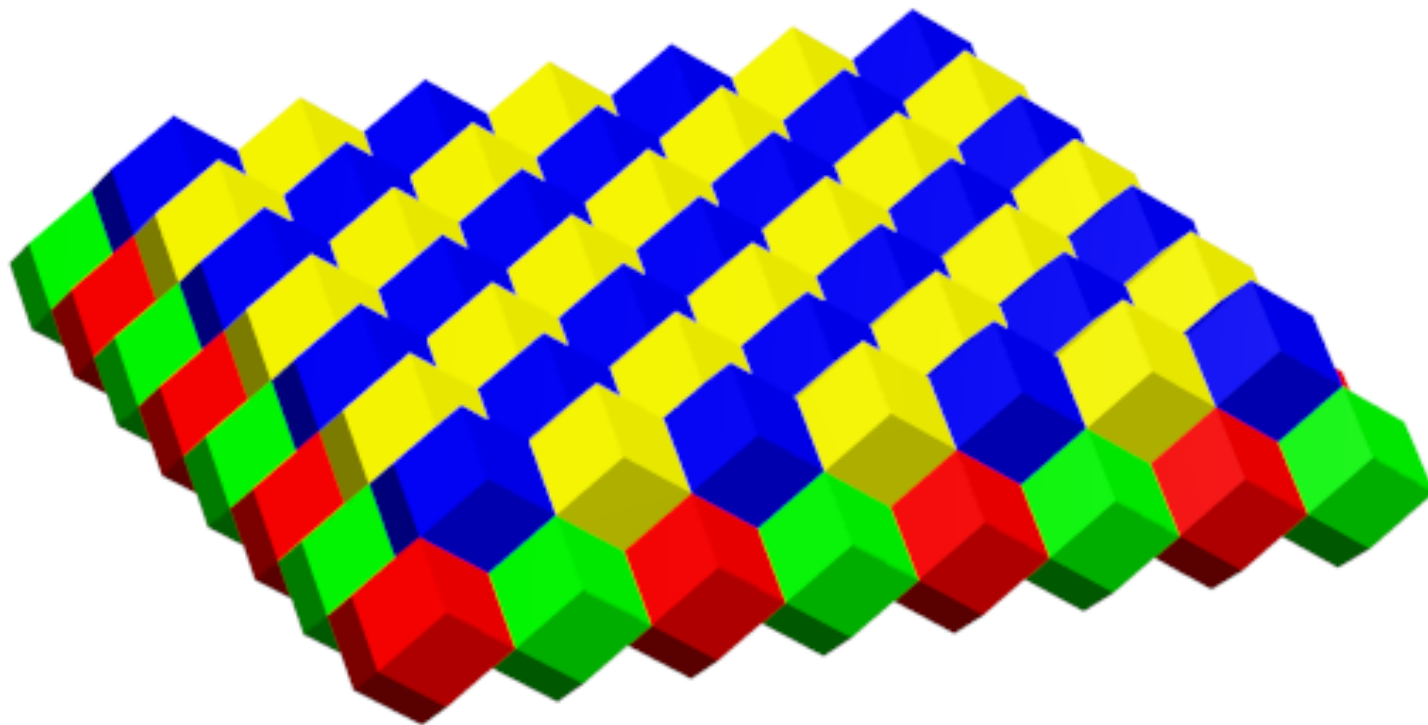
Sicht von oben. Wie viele Farben braucht es?

Das Rhombendodekaeder



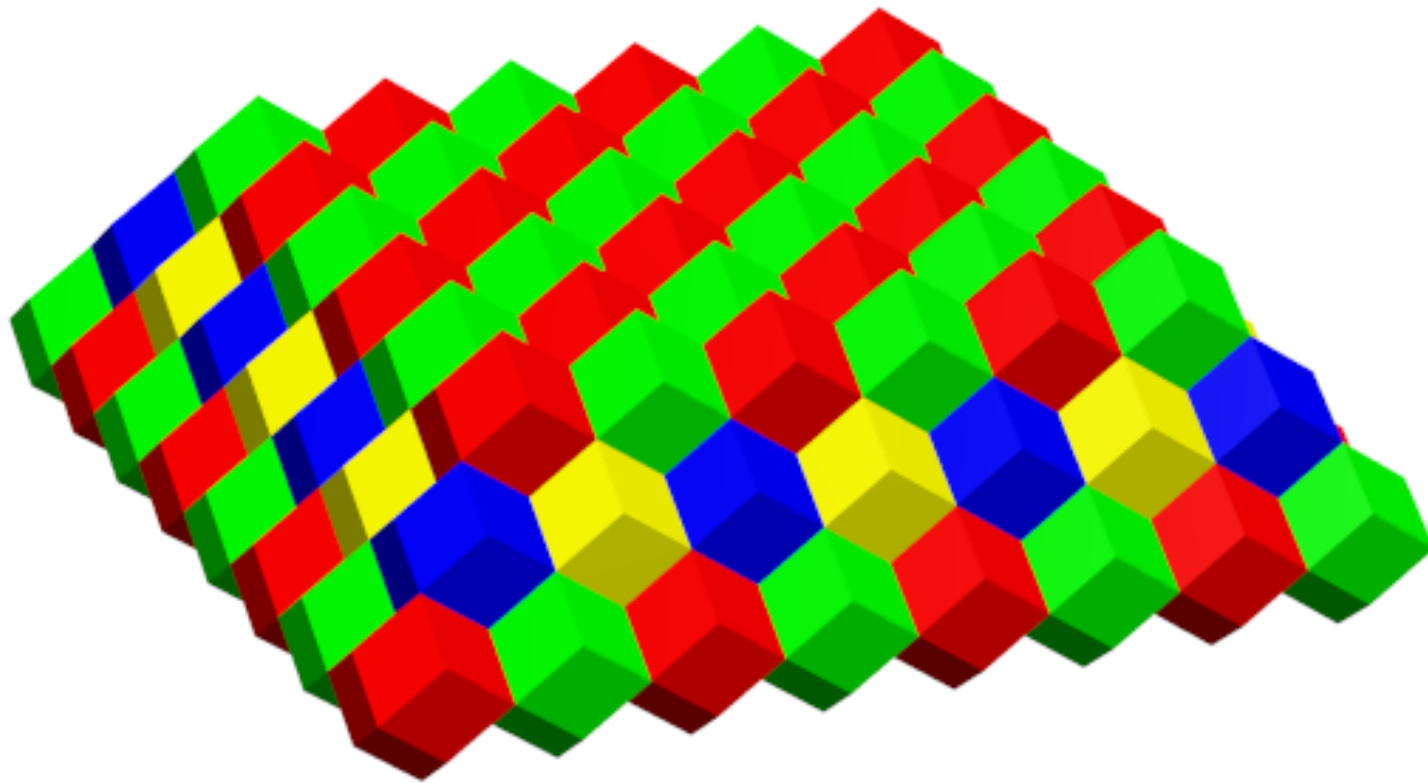
Oben 4 spitze Winkel

Das Rhombendodekaeder



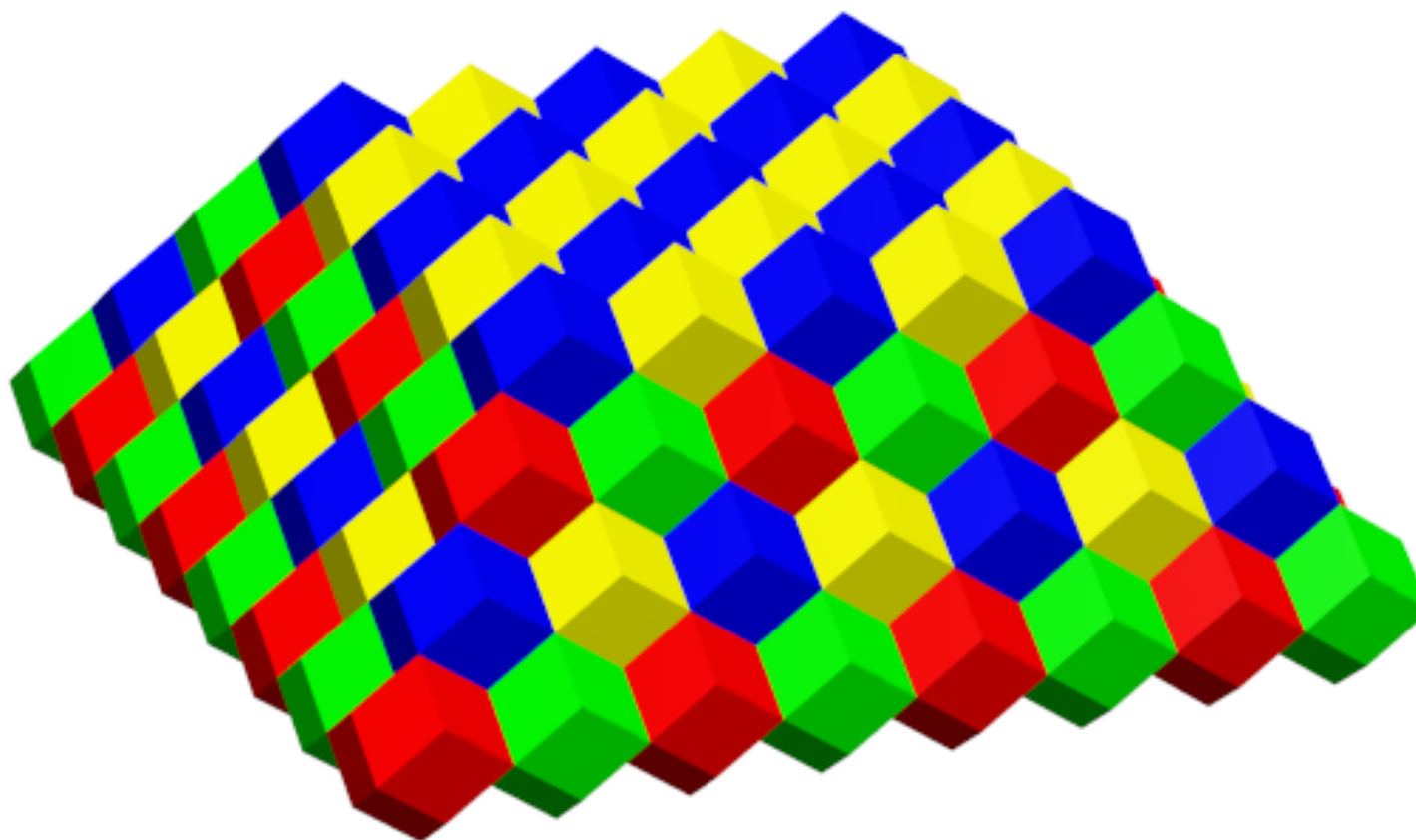
Oben 4 spitze Winkel

Das Rhombendodekaeder



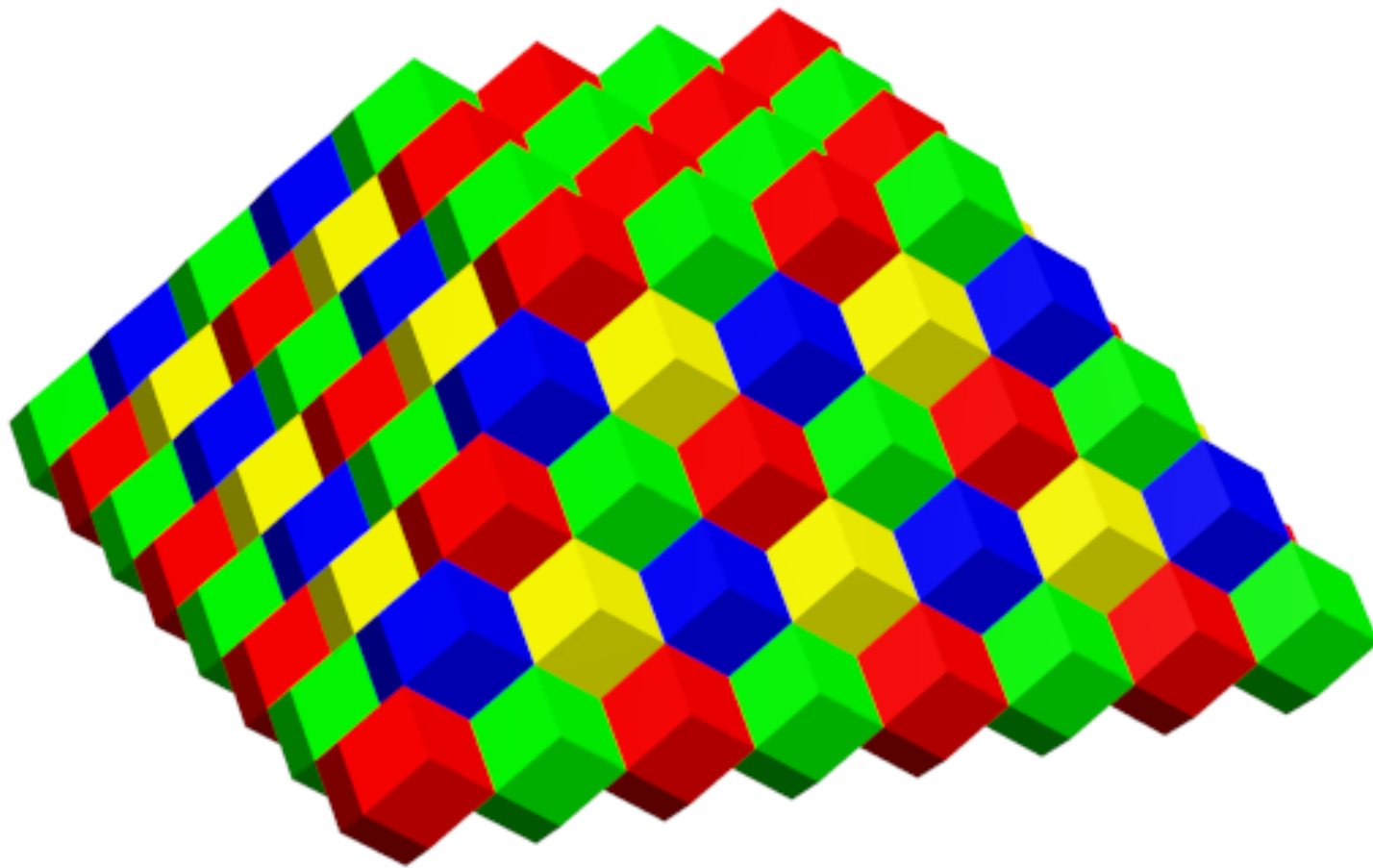
Oben 4 spitze Winkel

Das Rhombendodekaeder



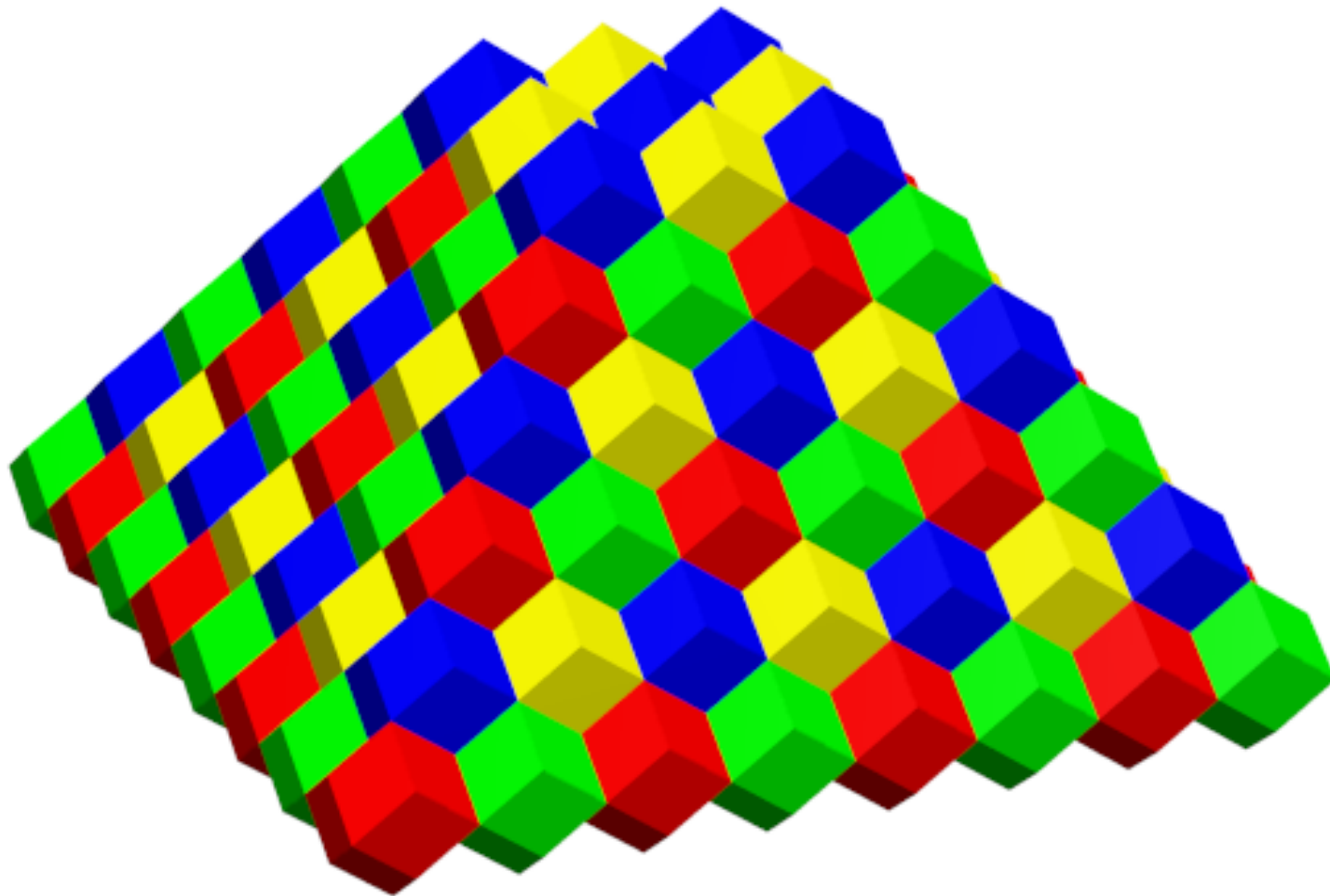
Oben 4 spitze Winkel

Das Rhombendodekaeder



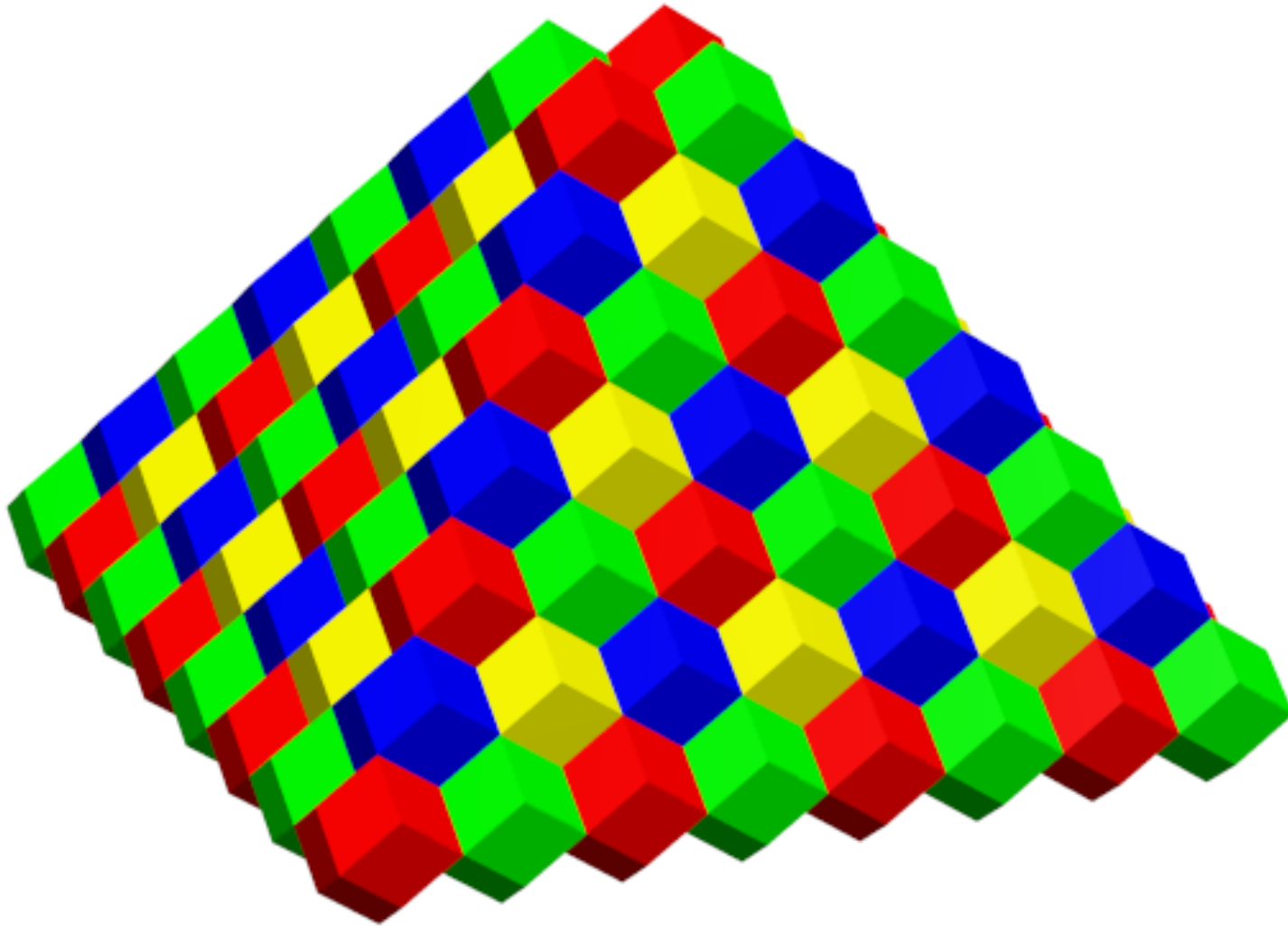
Oben 4 spitze Winkel

Das Rhombendodekaeder



Oben 4 spitze Winkel

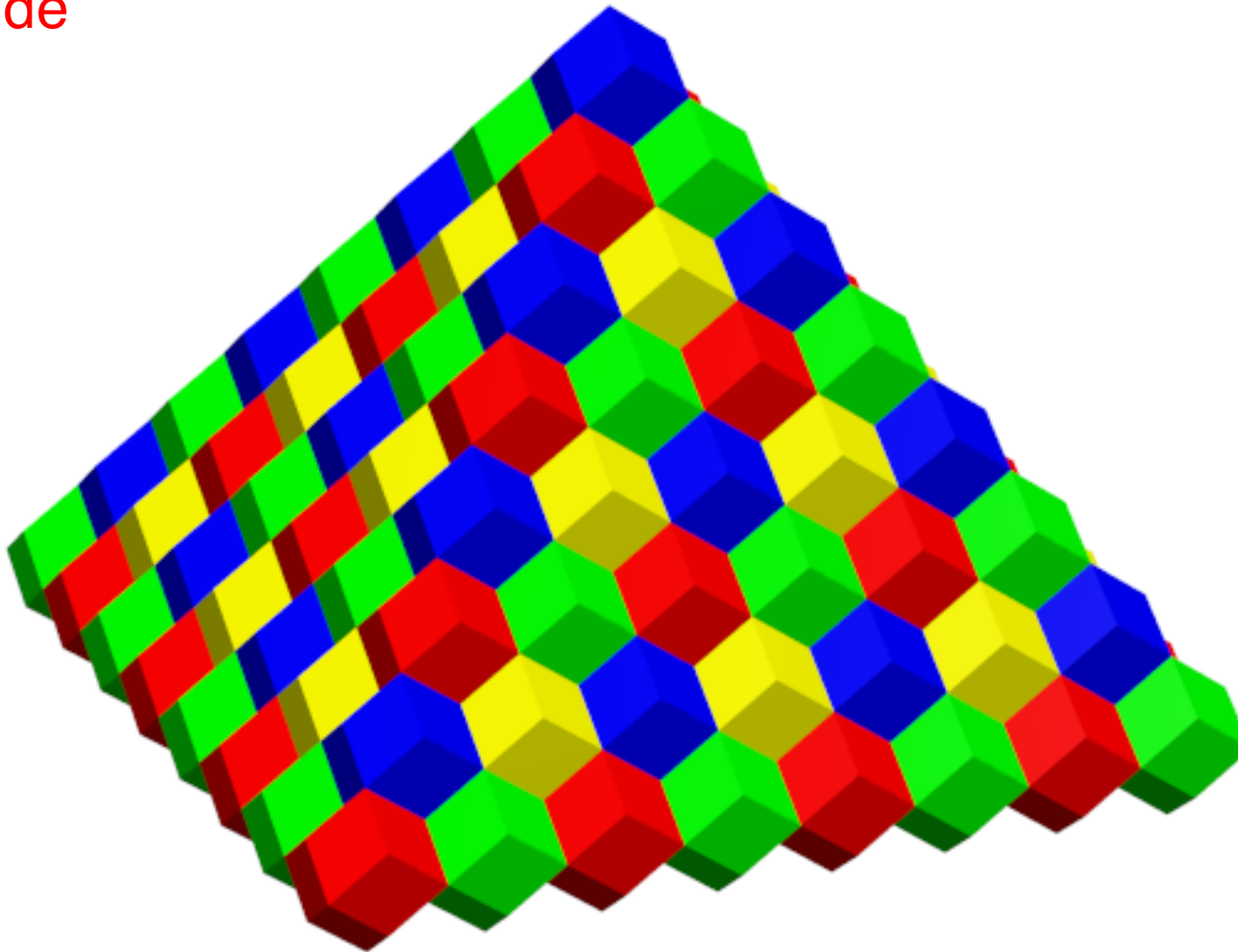
Das Rhombendodekaeder



Oben 4 spitze Winkel

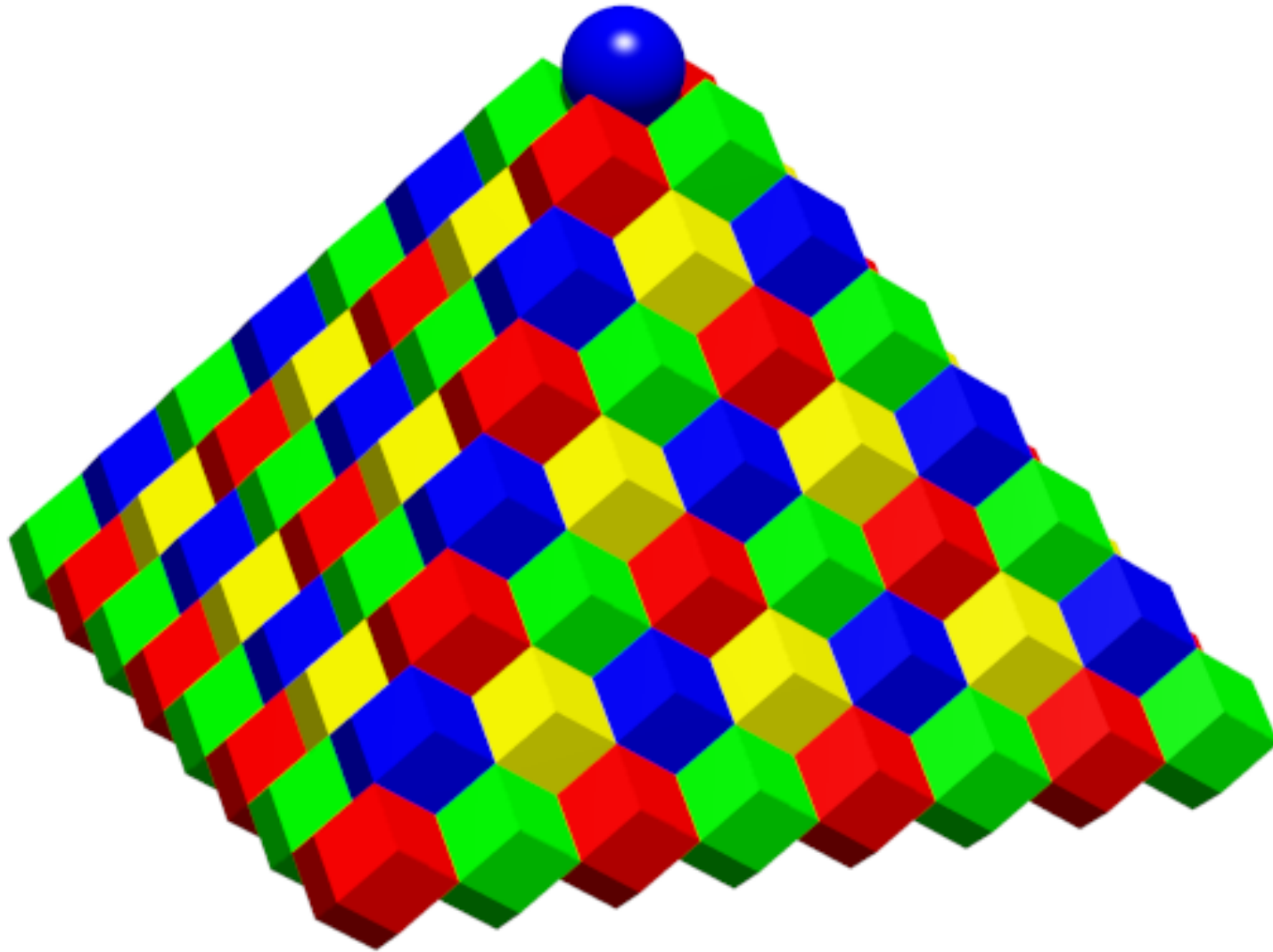
Das Rhombendodekaeder

Pyramide



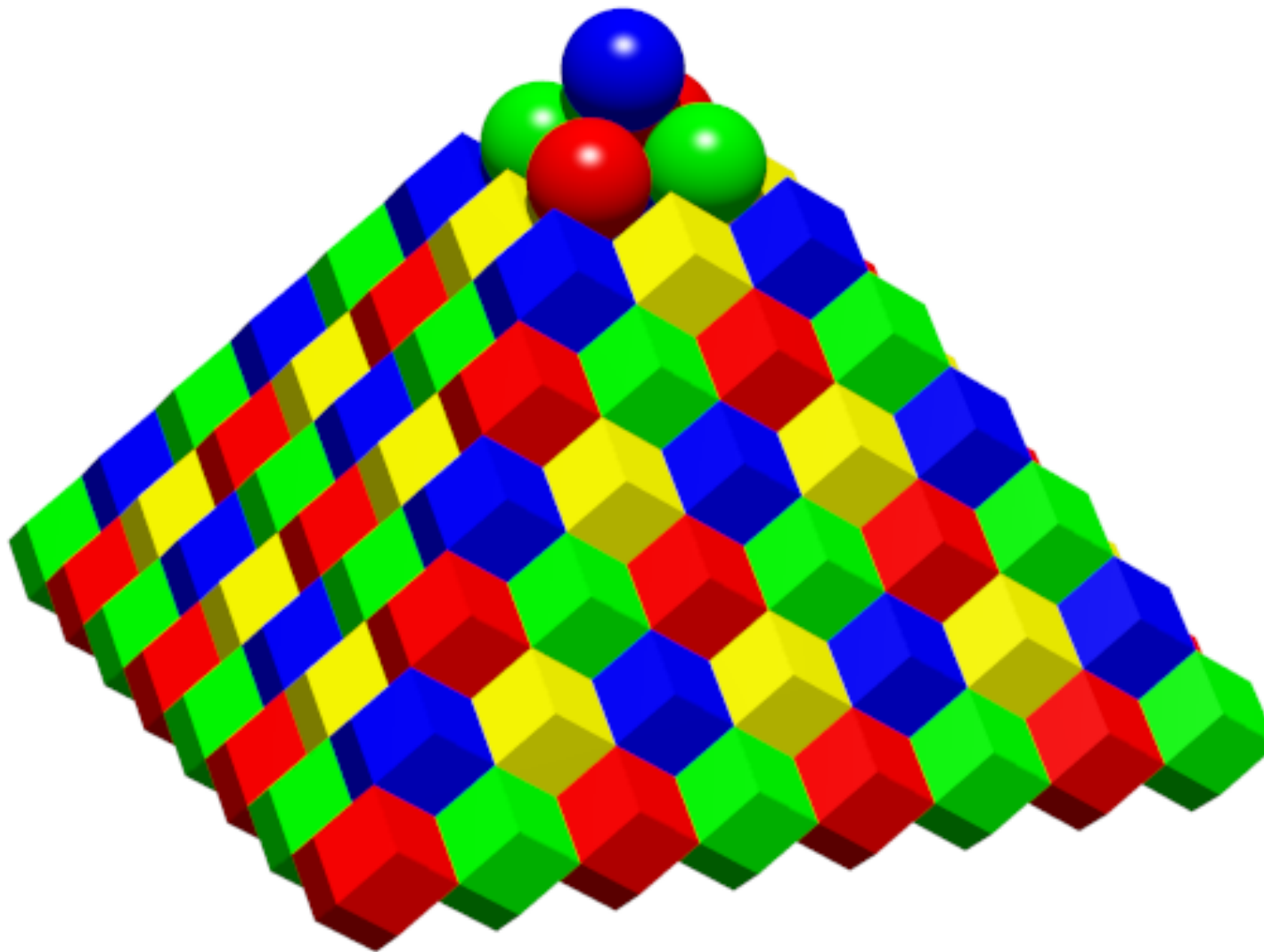
Oben 4 spitze Winkel

Das Rhombendodekaeder

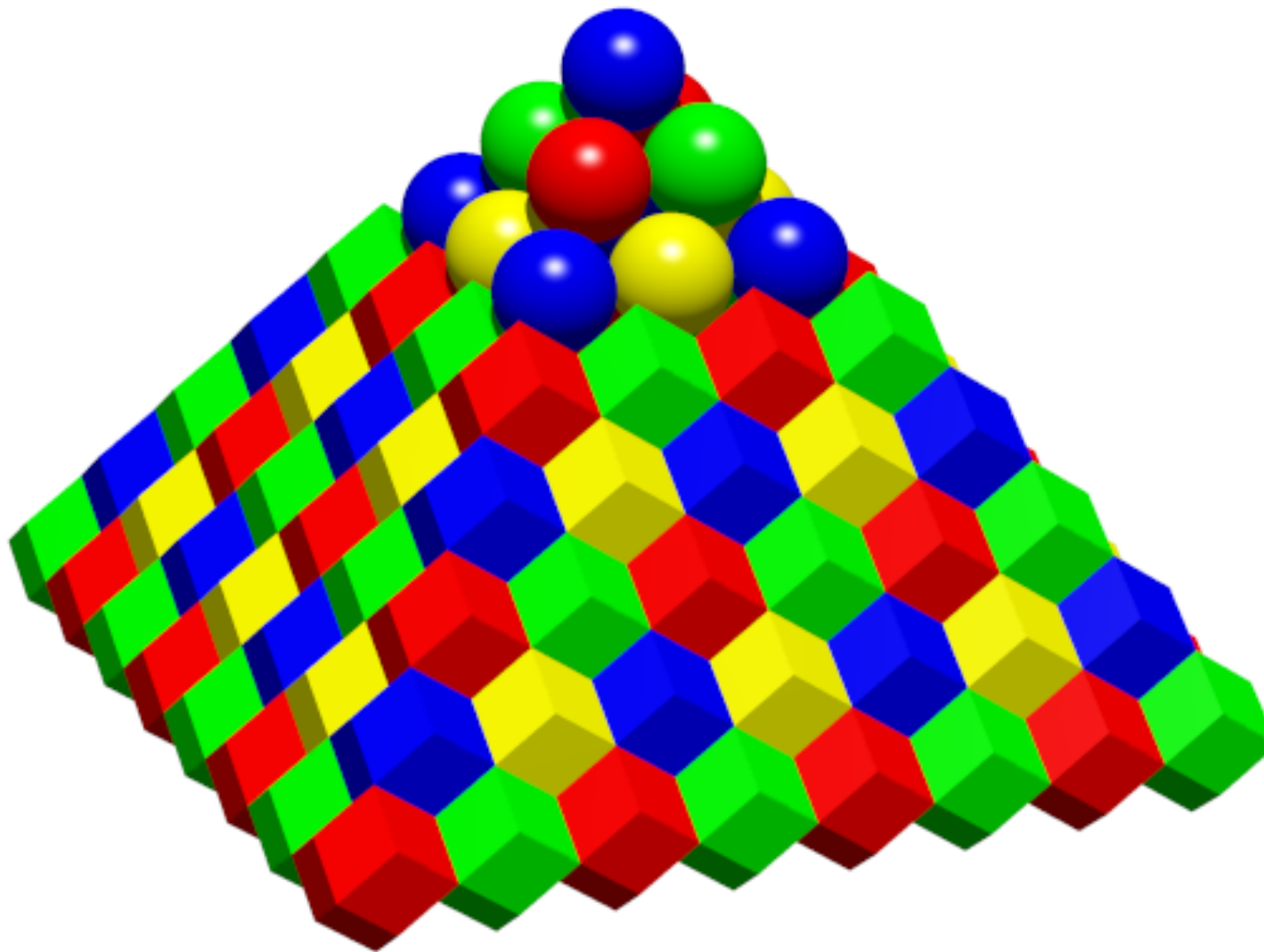


Inkugel

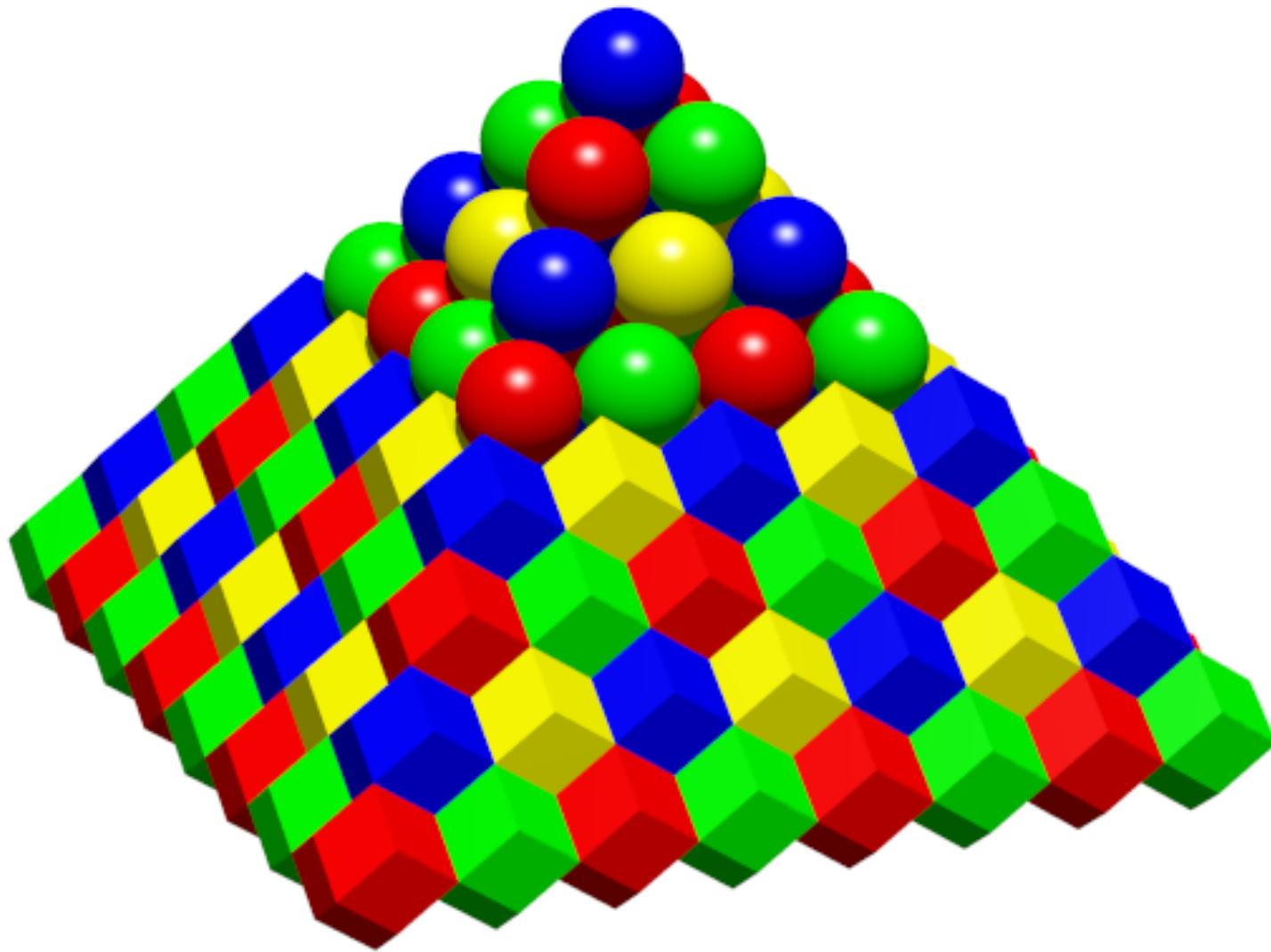
Das Rhombendodekaeder



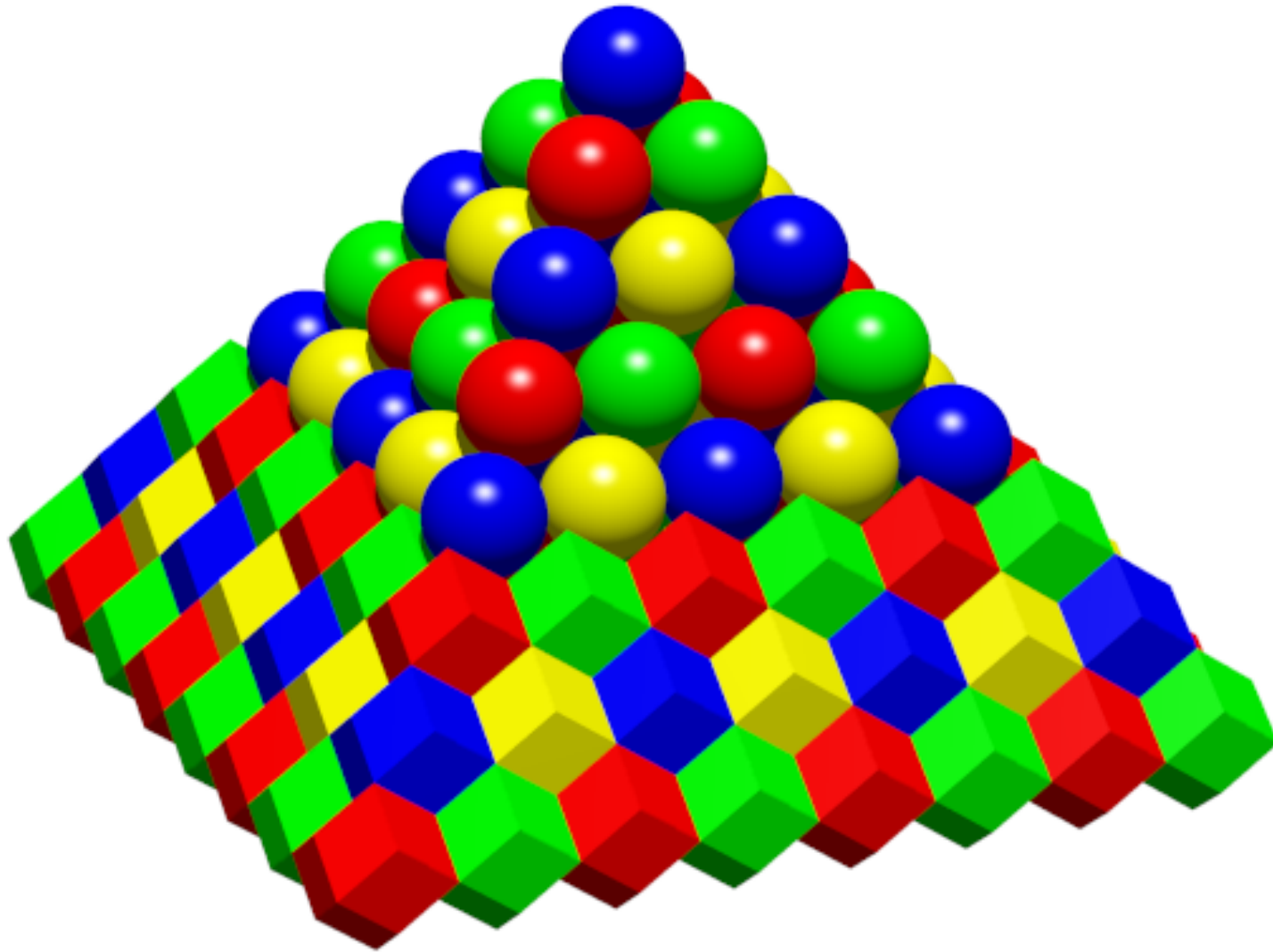
Das Rhombendodekaeder



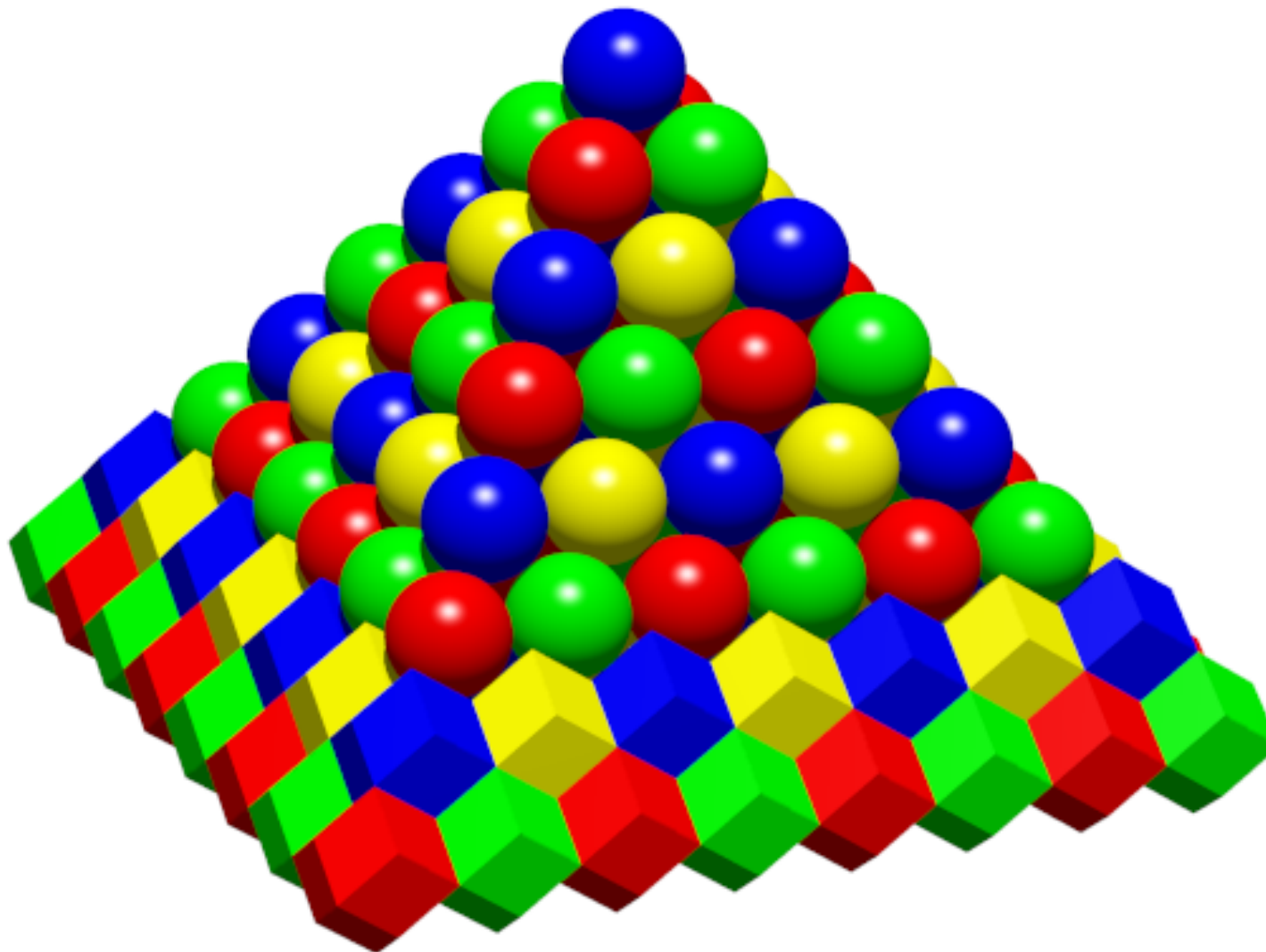
Das Rhombendodekaeder



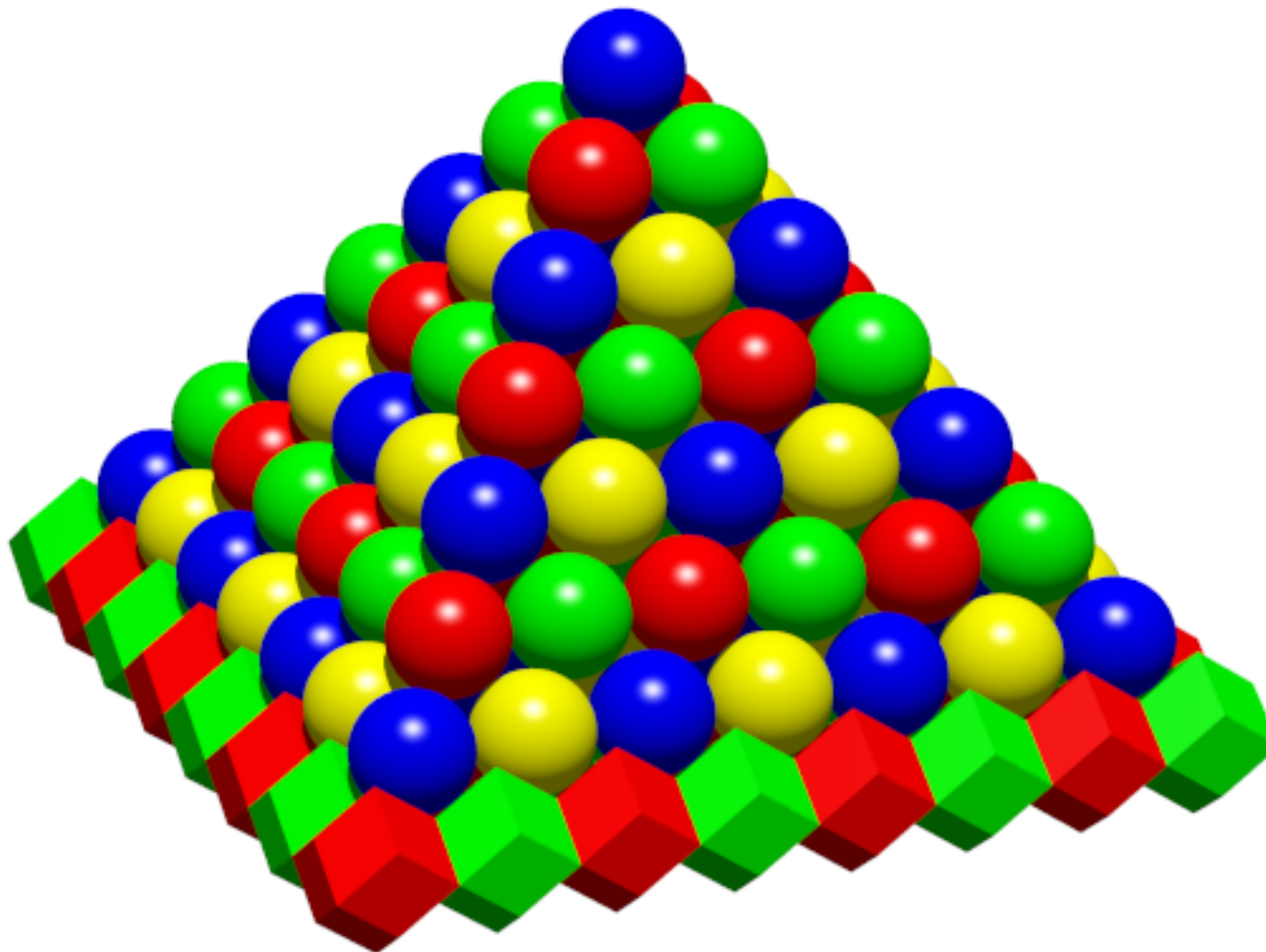
Das Rhombendodekaeder



Das Rhombendodekaeder

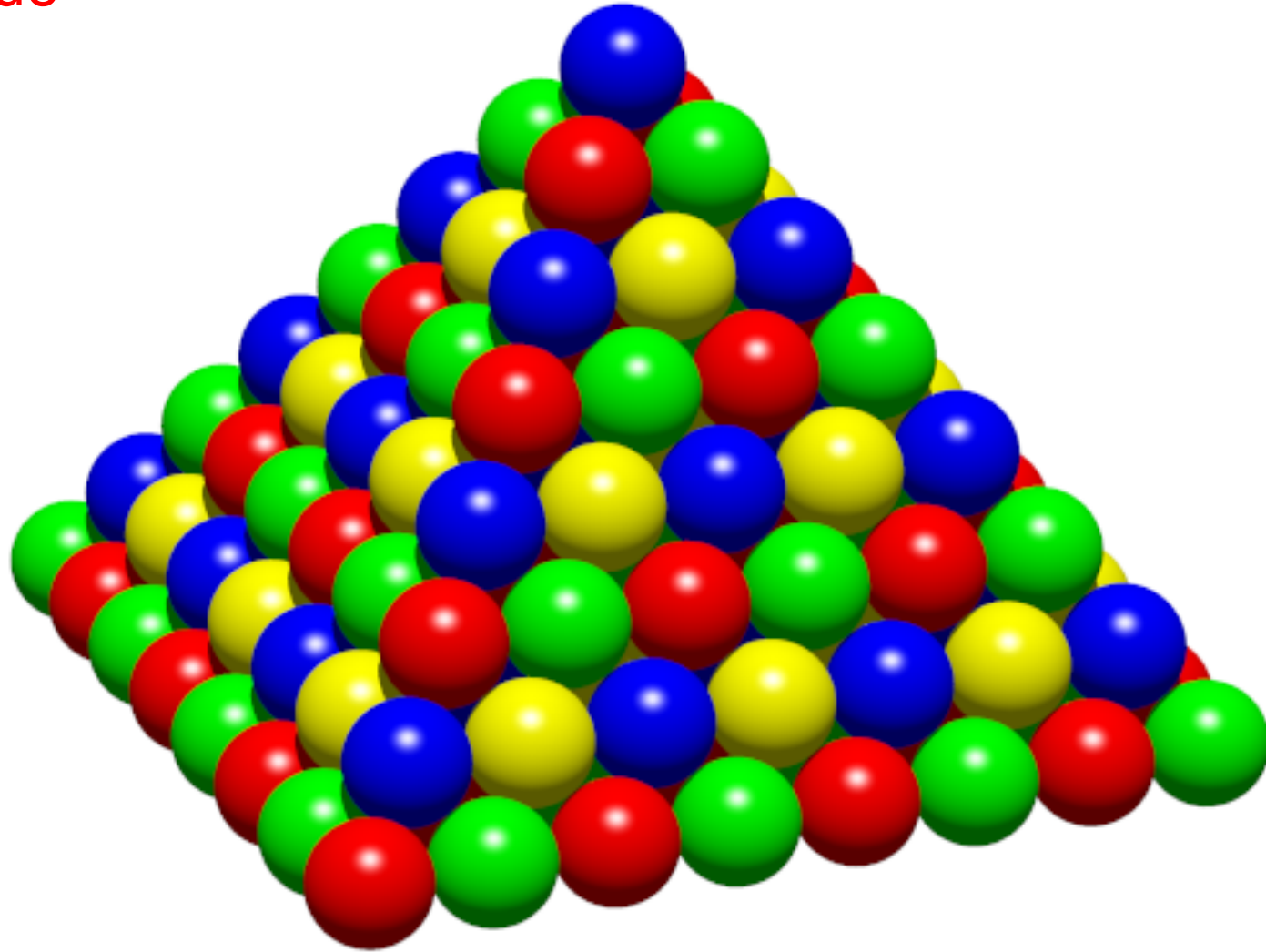


Das Rhombendodekaeder



Das Rhombendodekaeder

Pyramide



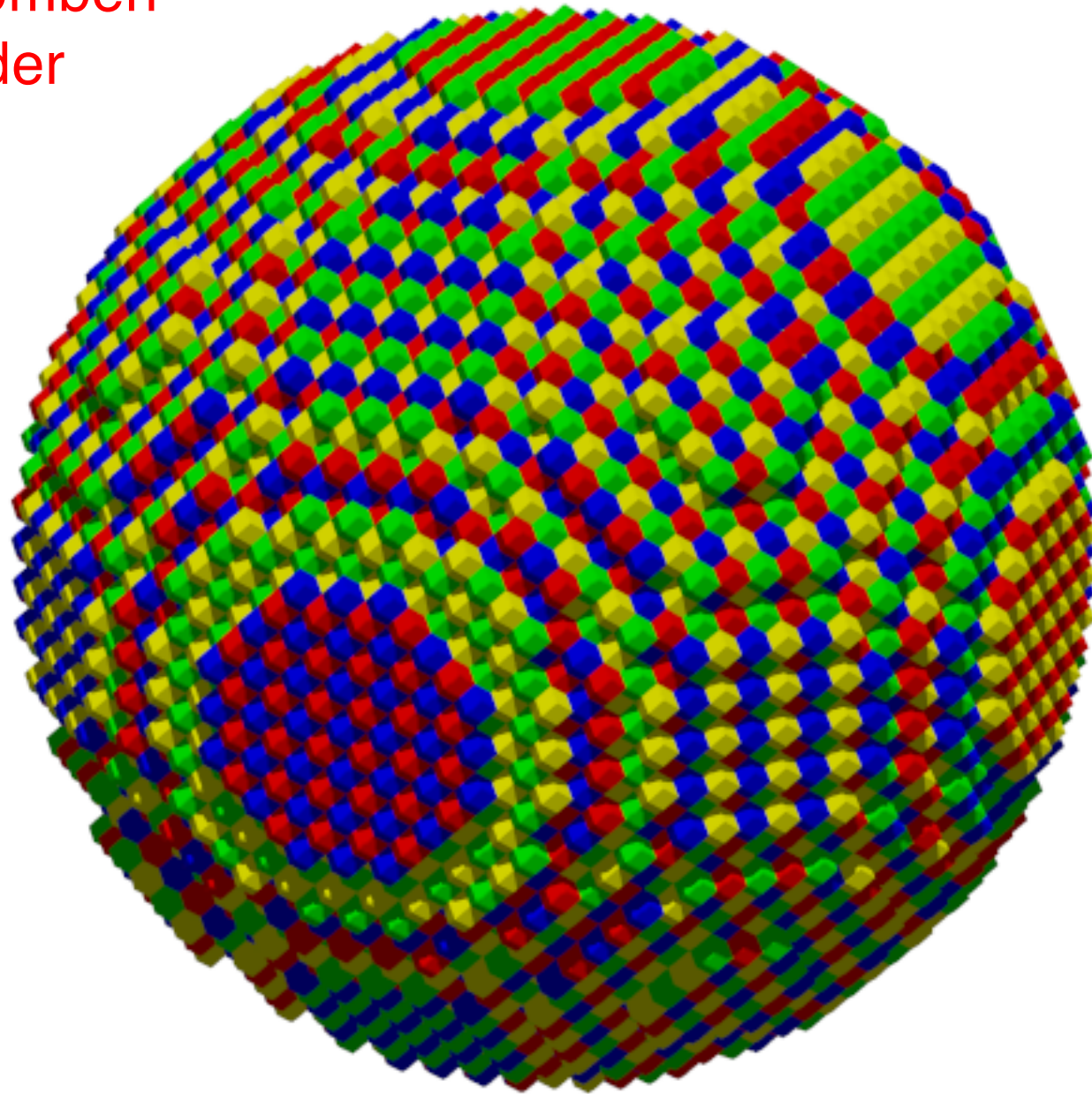
Dichteste Kugelpackung (Kepler 1611, Hales 1998-2014)

Das Rhombendodekaeder

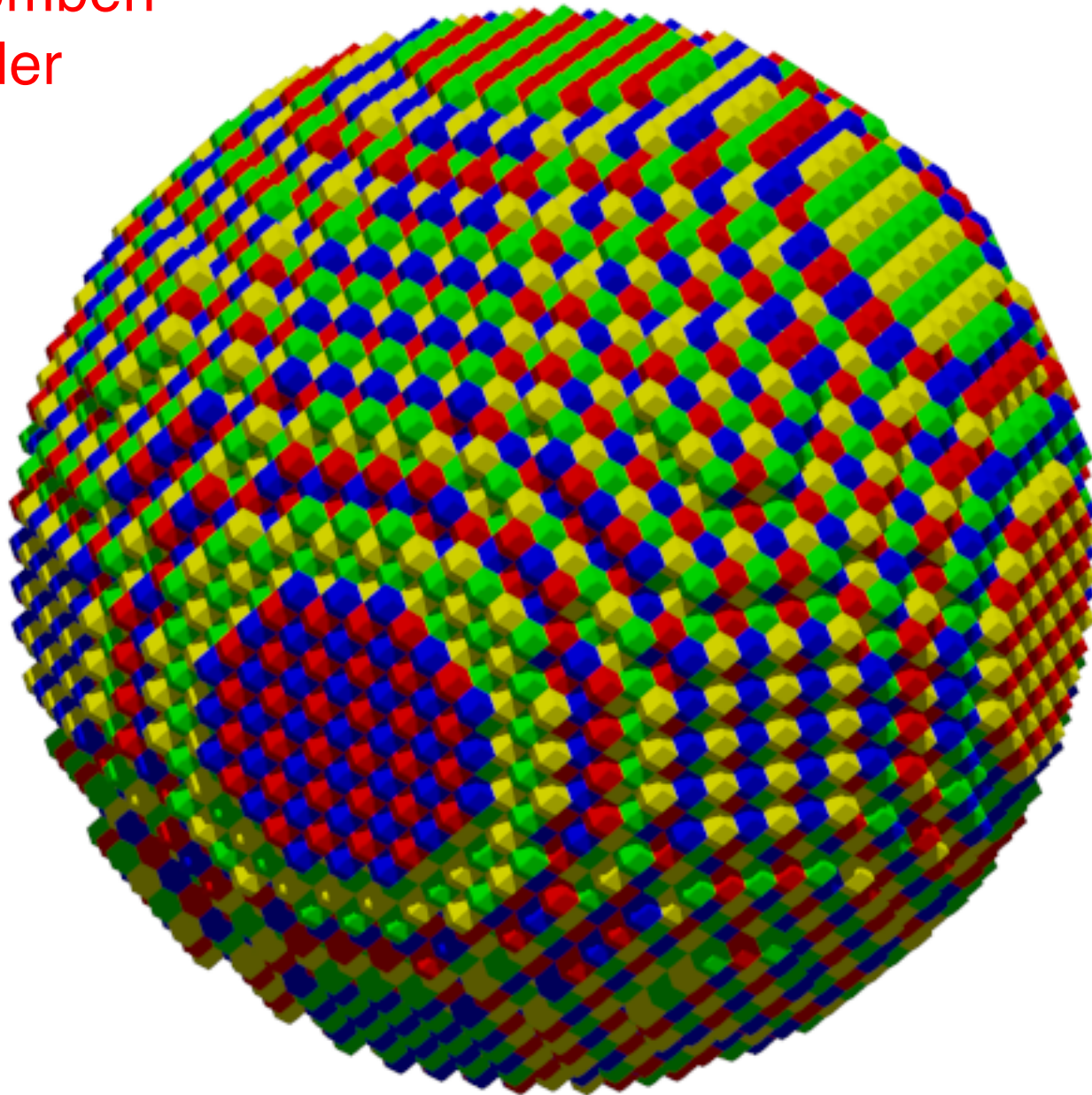


Dichteste Kugelpackung (Kepler 1611, Hales 1998-2014)

3564 Rhomben-
dodekaeder

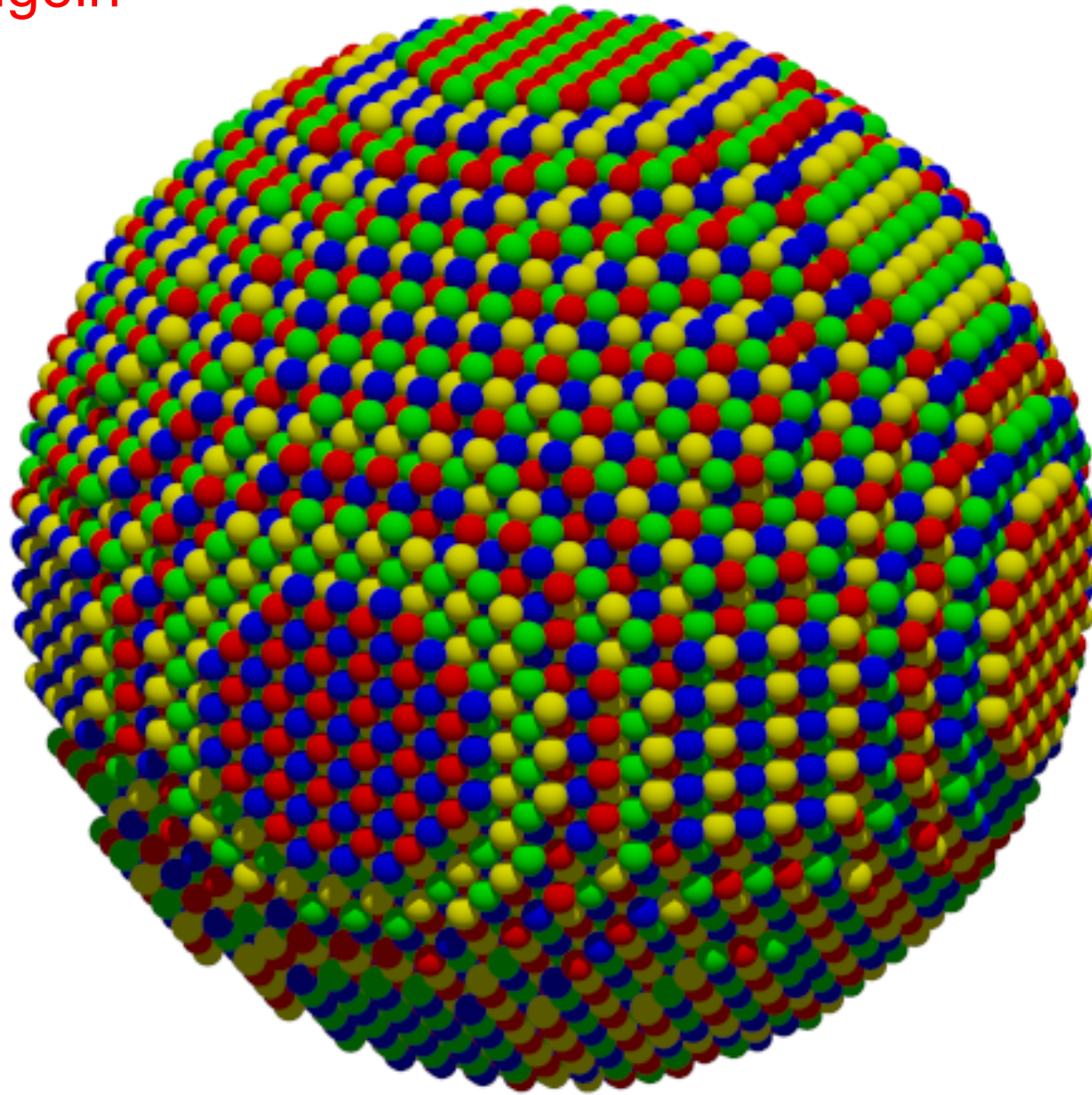


3564 Rhomben-
dodekaeder

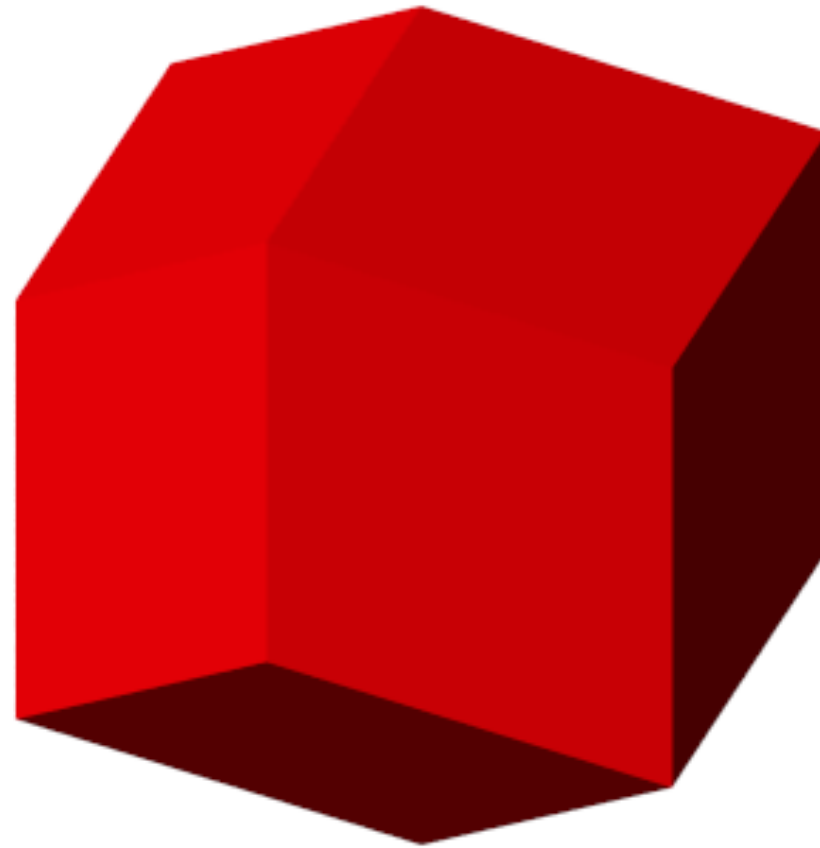


$$\pi \approx \frac{99}{32} = 3.09375$$

3564 Inkugeln

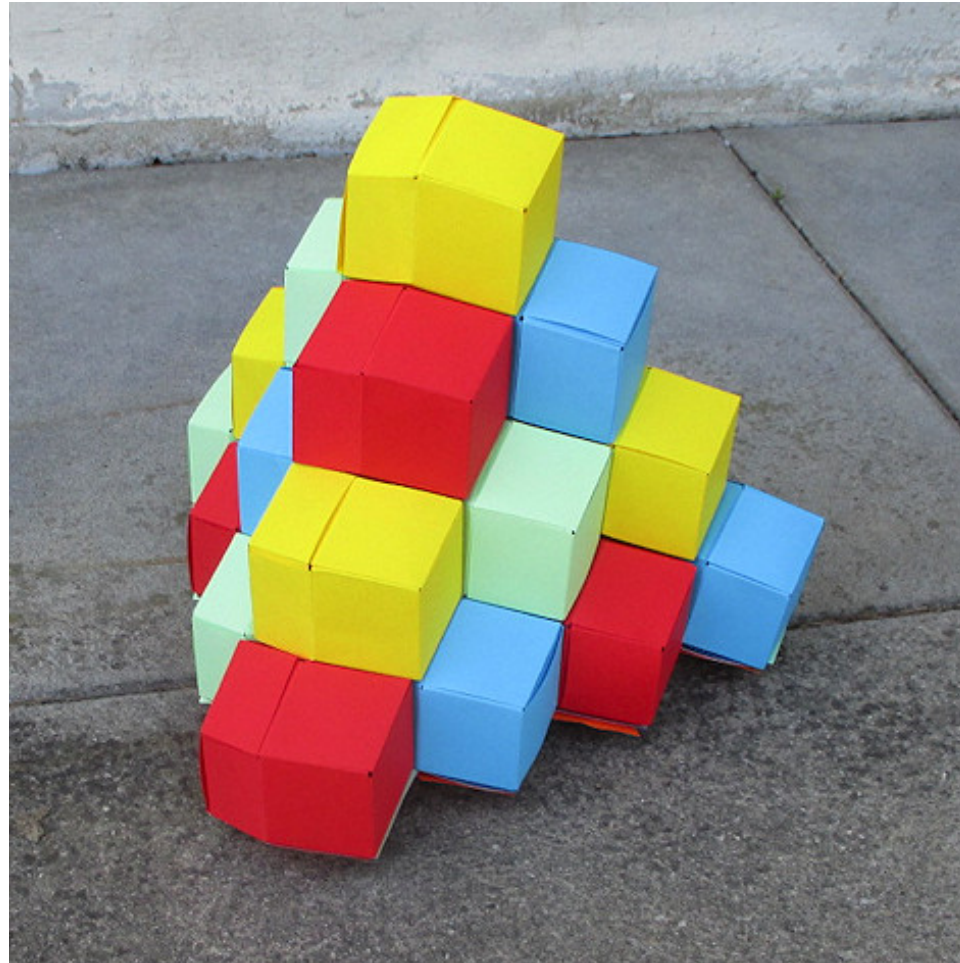


Das Rhombendodekaeder



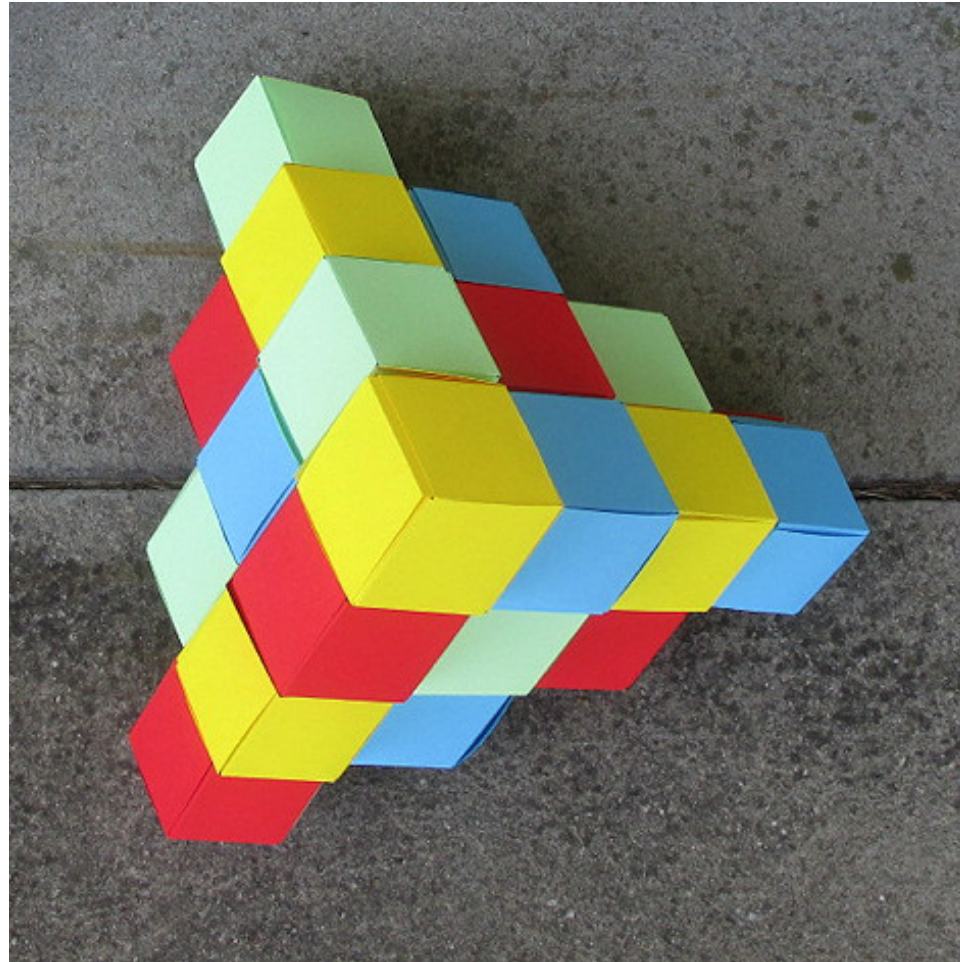
Oben 3 stumpfe Winkel

Das Rhombendodekaeder ist ein Raumfüller



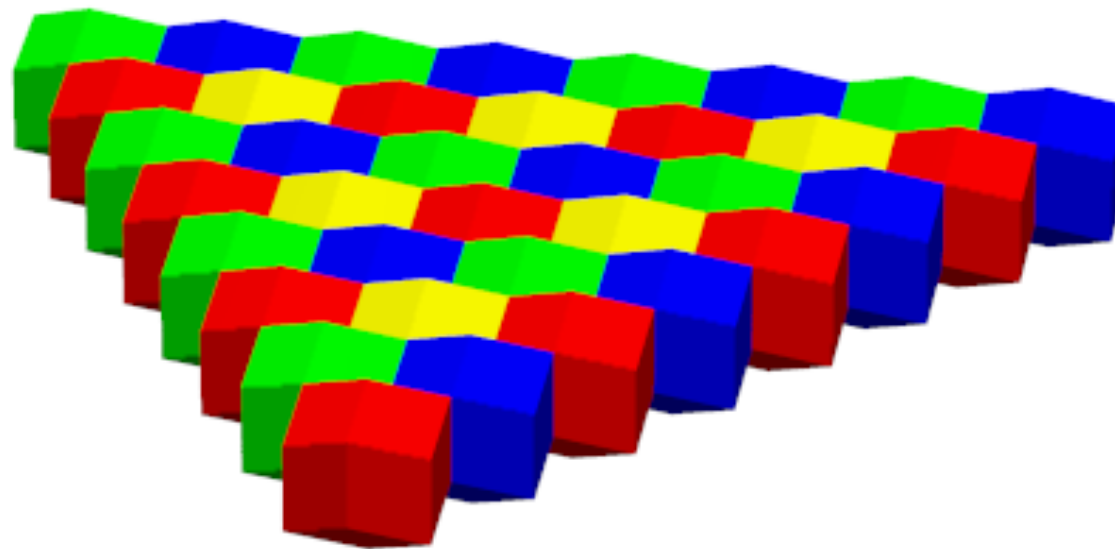
Oben 3 stumpfe Winkel

Das Rhombendodekaeder ist ein Raumfüller



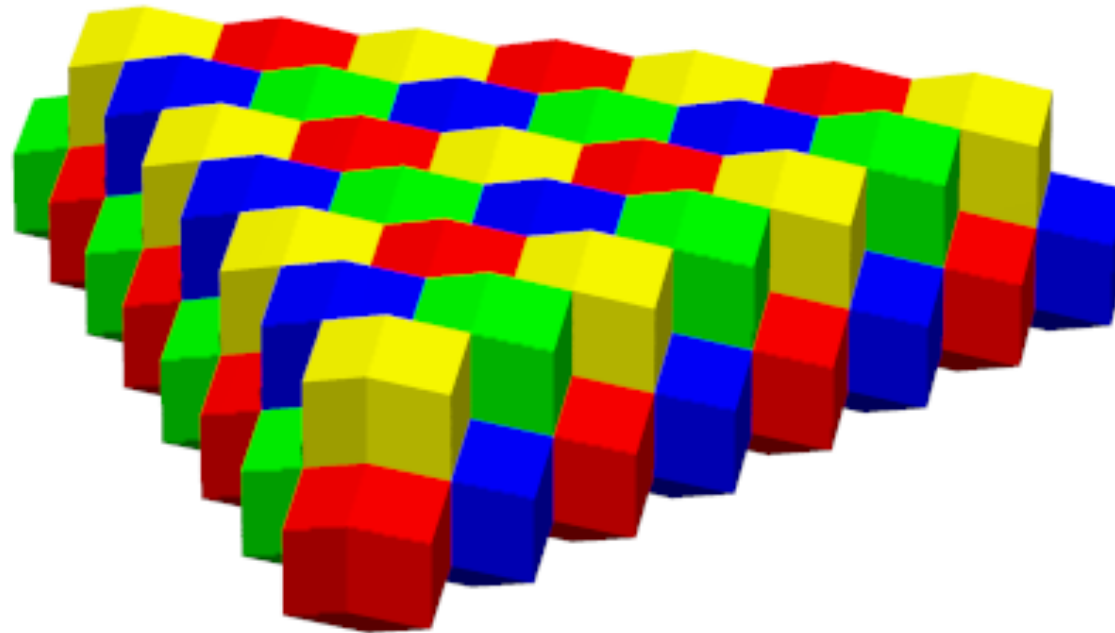
Sicht von oben

Das Rhombendodekaeder



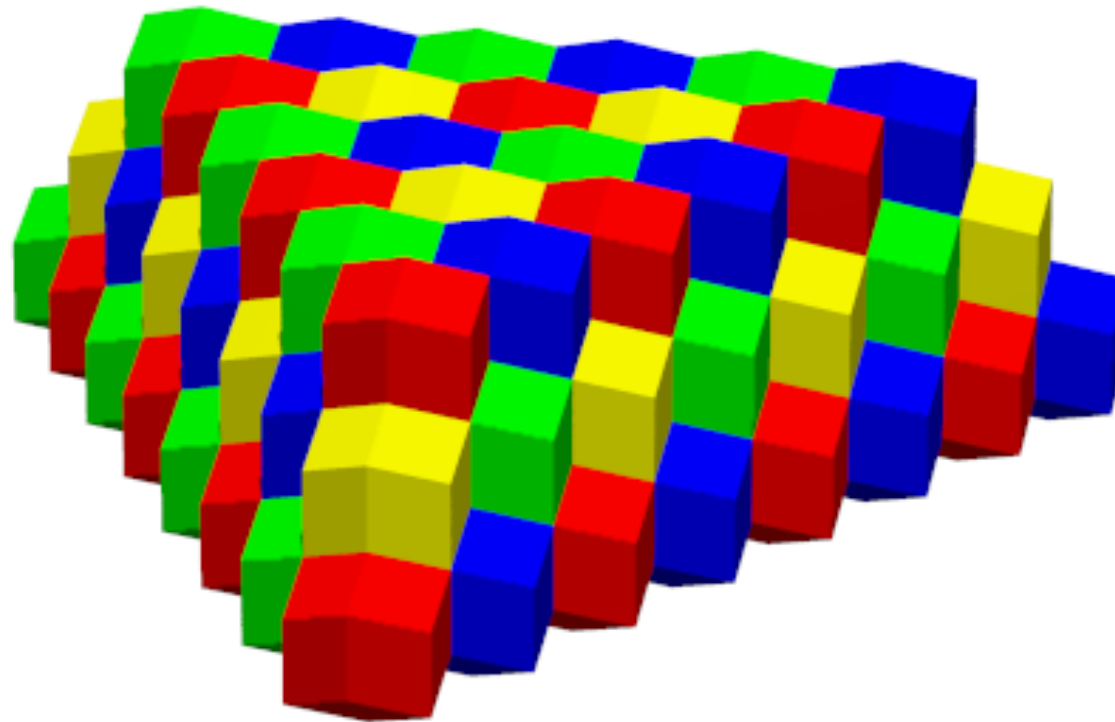
Oben 3 stumpfe Winkel

Das Rhombendodekaeder



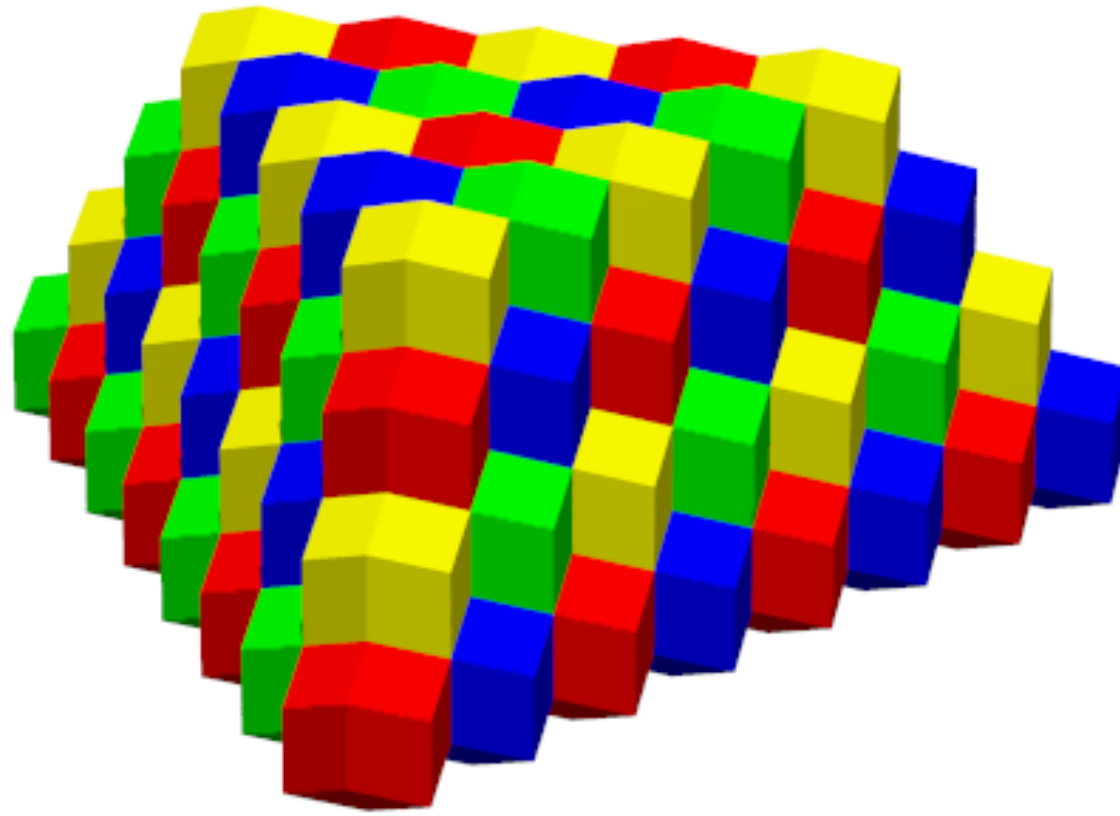
Oben 3 stumpfe Winkel

Das Rhombendodekaeder



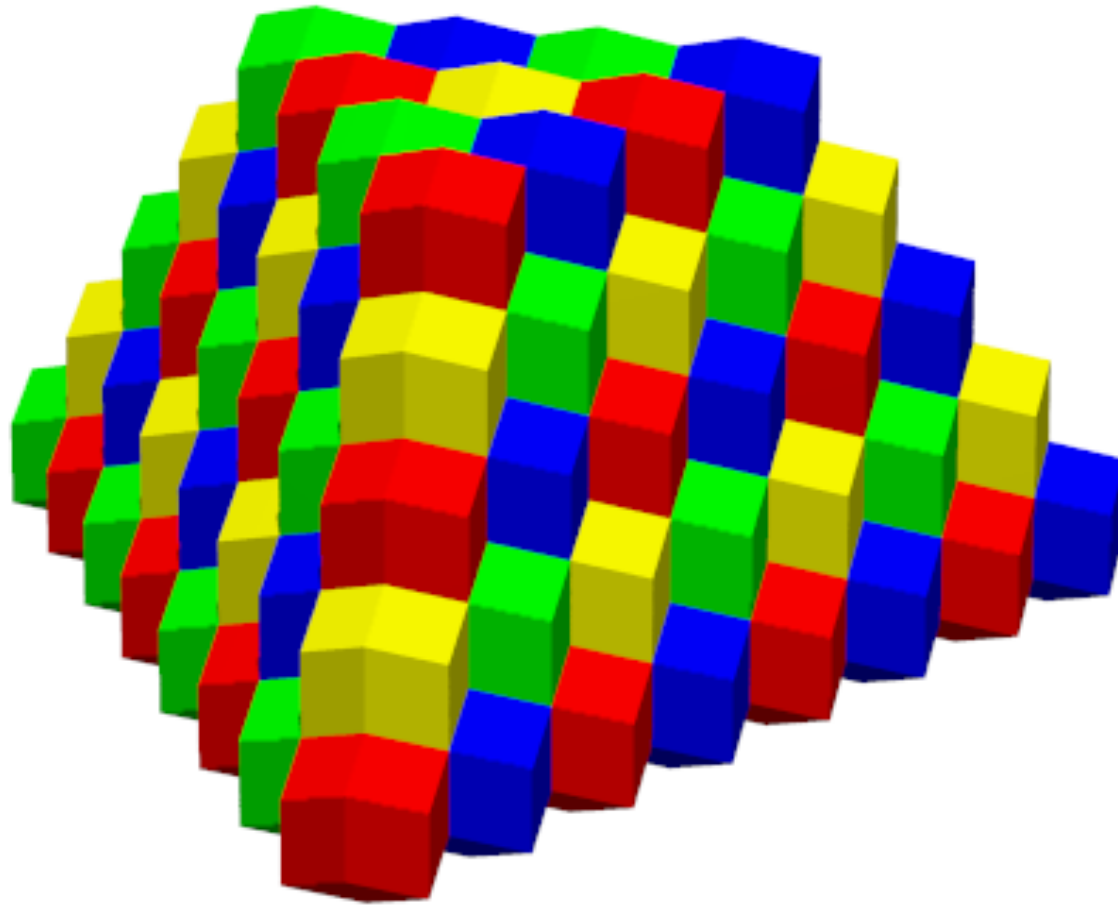
Oben 3 stumpfe Winkel

Das Rhombendodekaeder



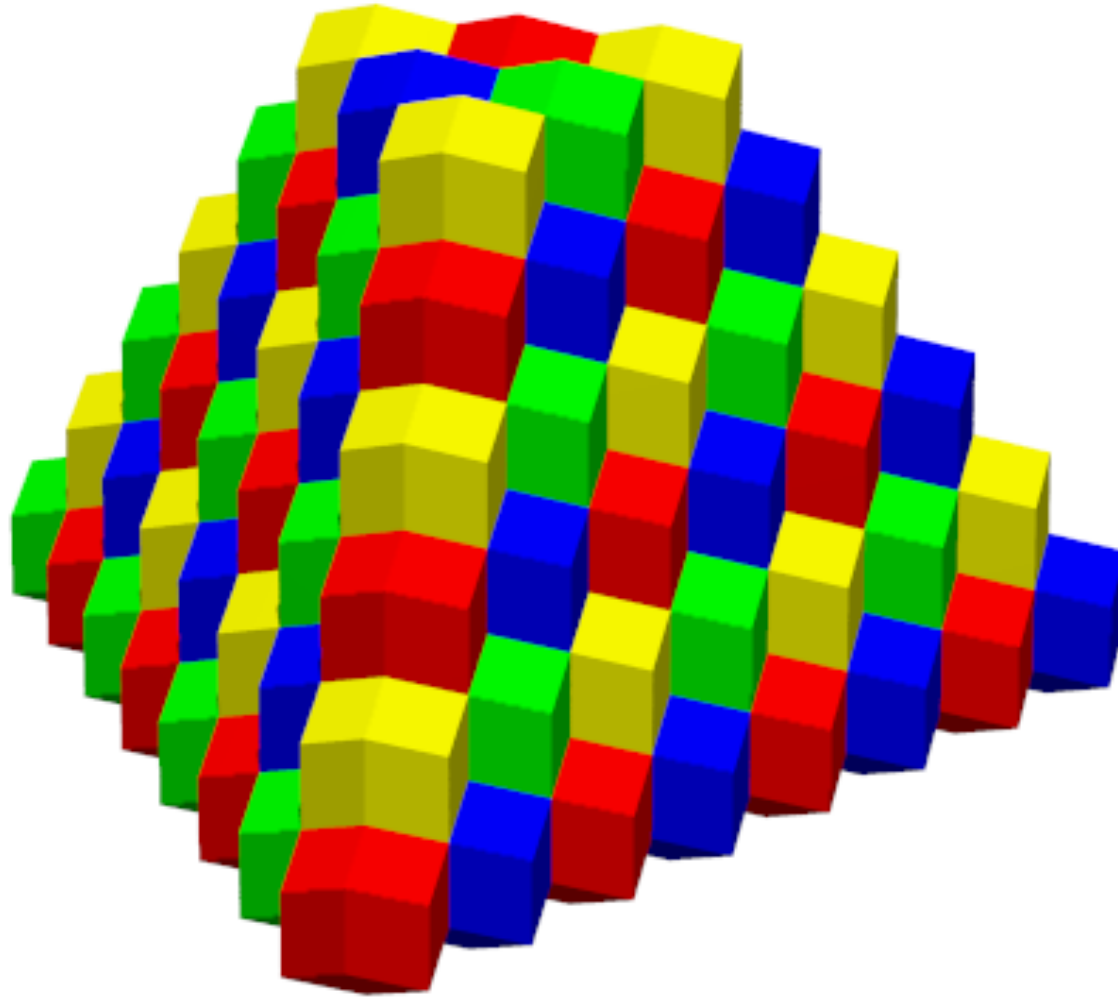
Oben 3 stumpfe Winkel

Das Rhombendodekaeder



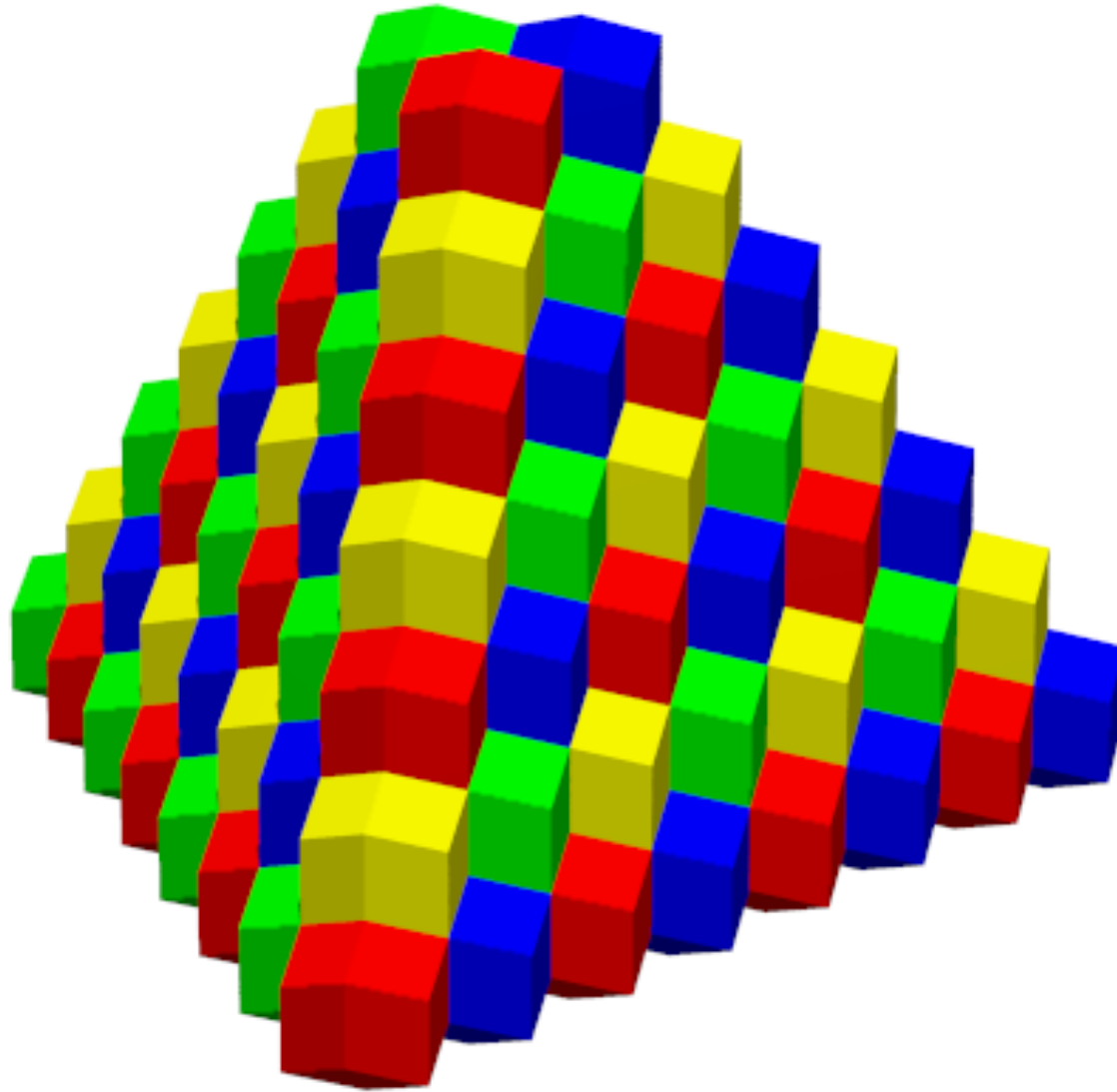
Oben 3 stumpfe Winkel

Das Rhombendodekaeder



Oben 3 stumpfe Winkel

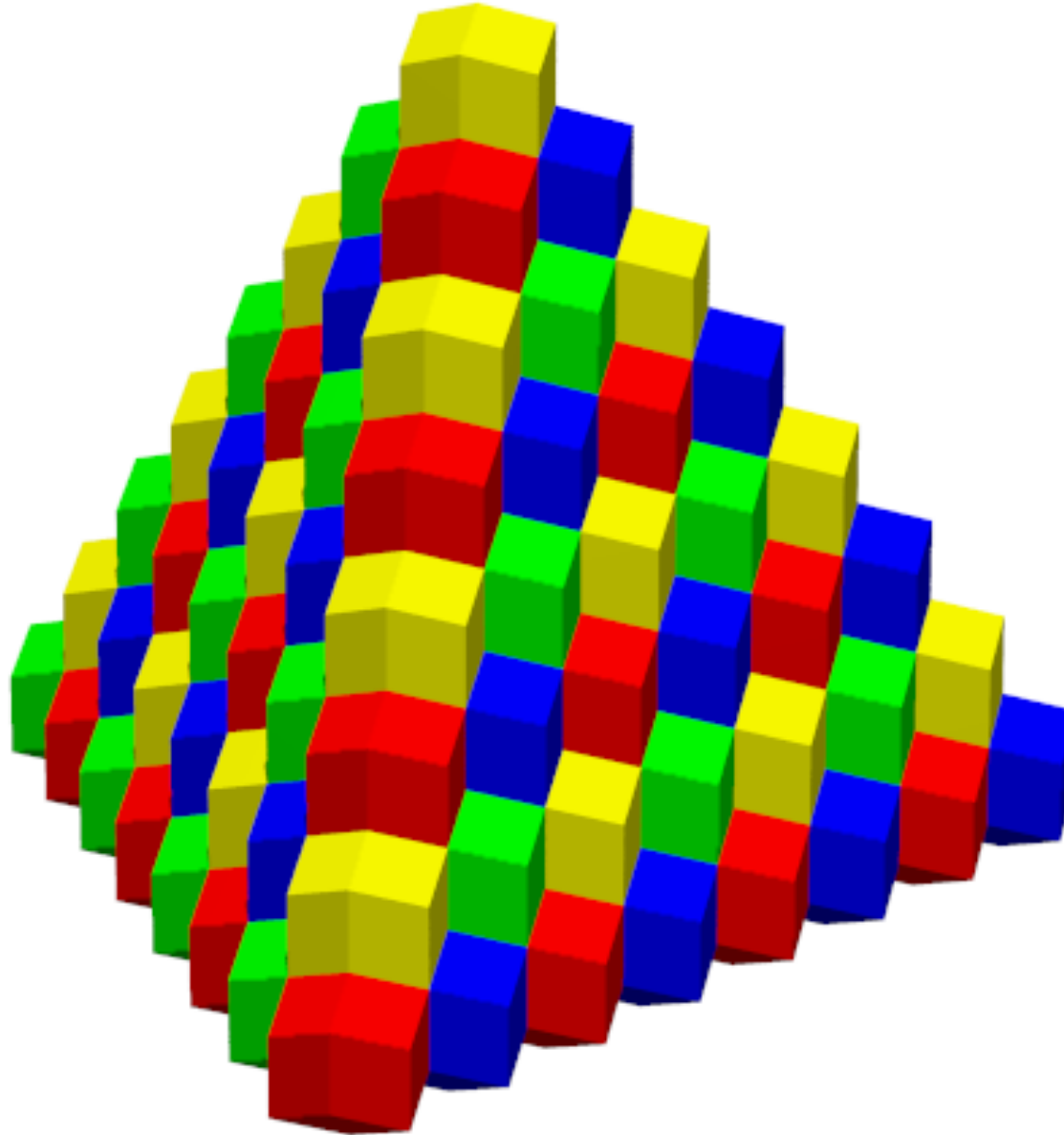
Das Rhombendodekaeder



Oben 3 stumpfe Winkel

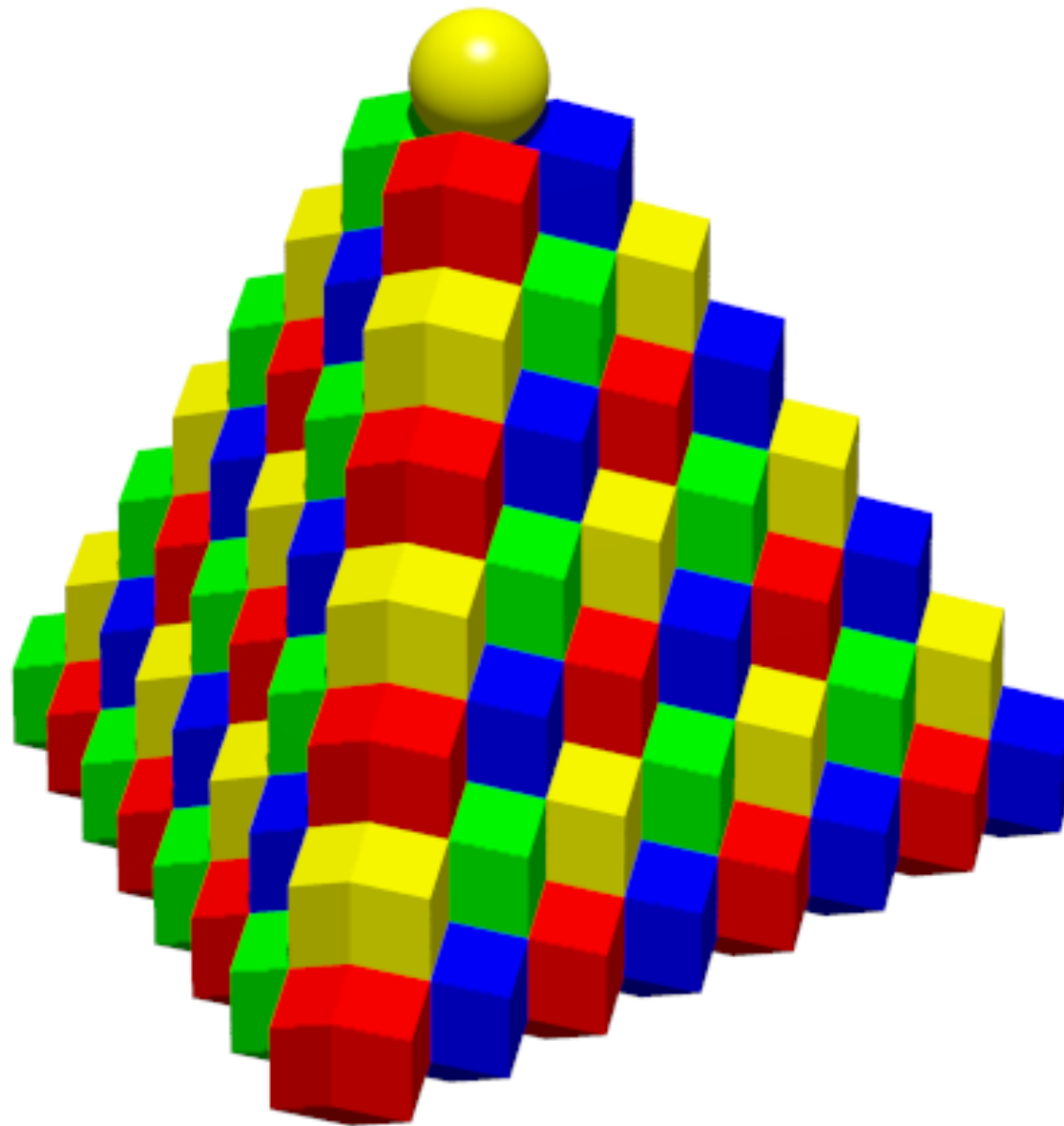
Das Rhombendodekaeder

Tetraeder



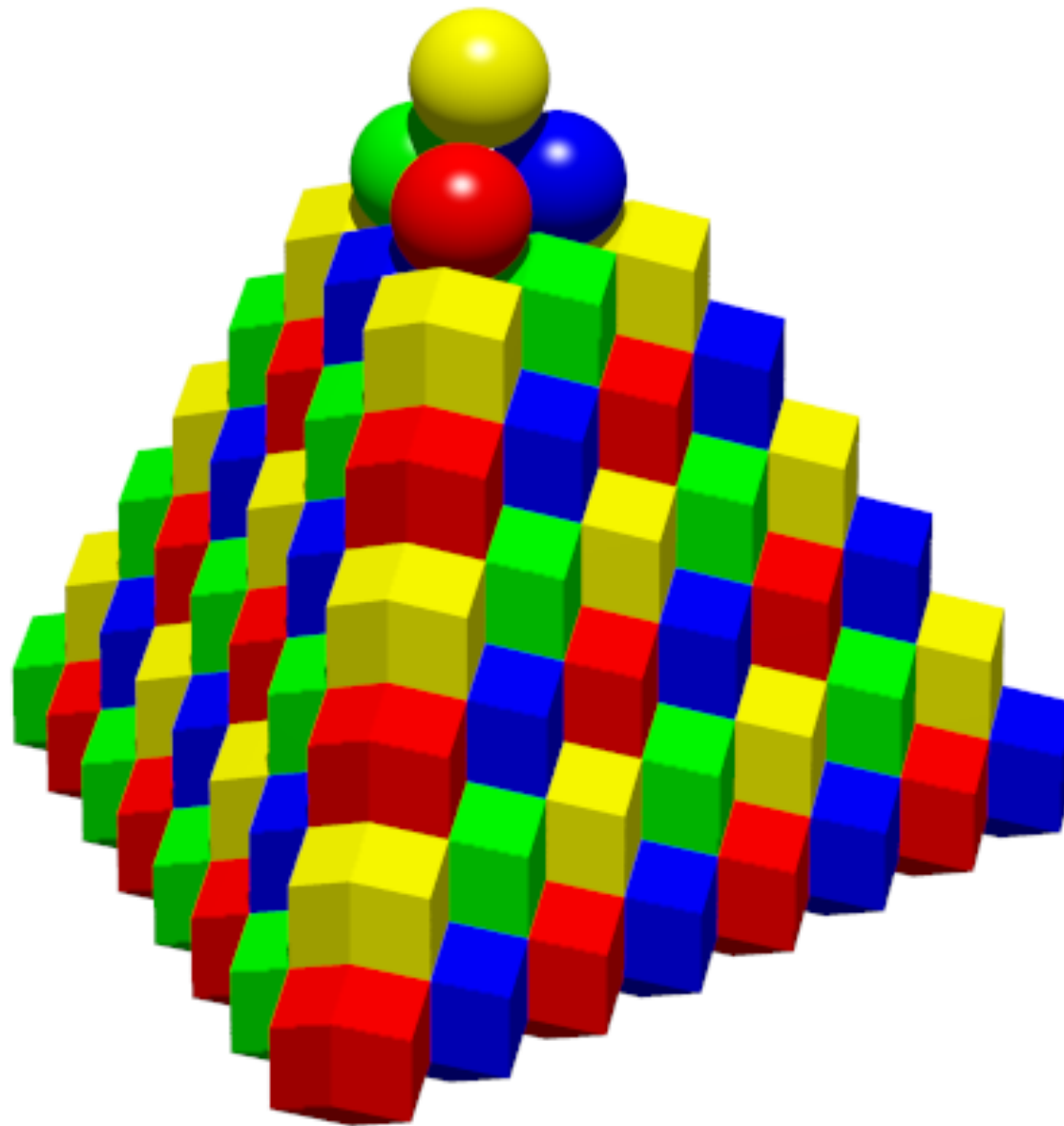
Oben 3 stumpfe Winkel

Das Rhombendodekaeder

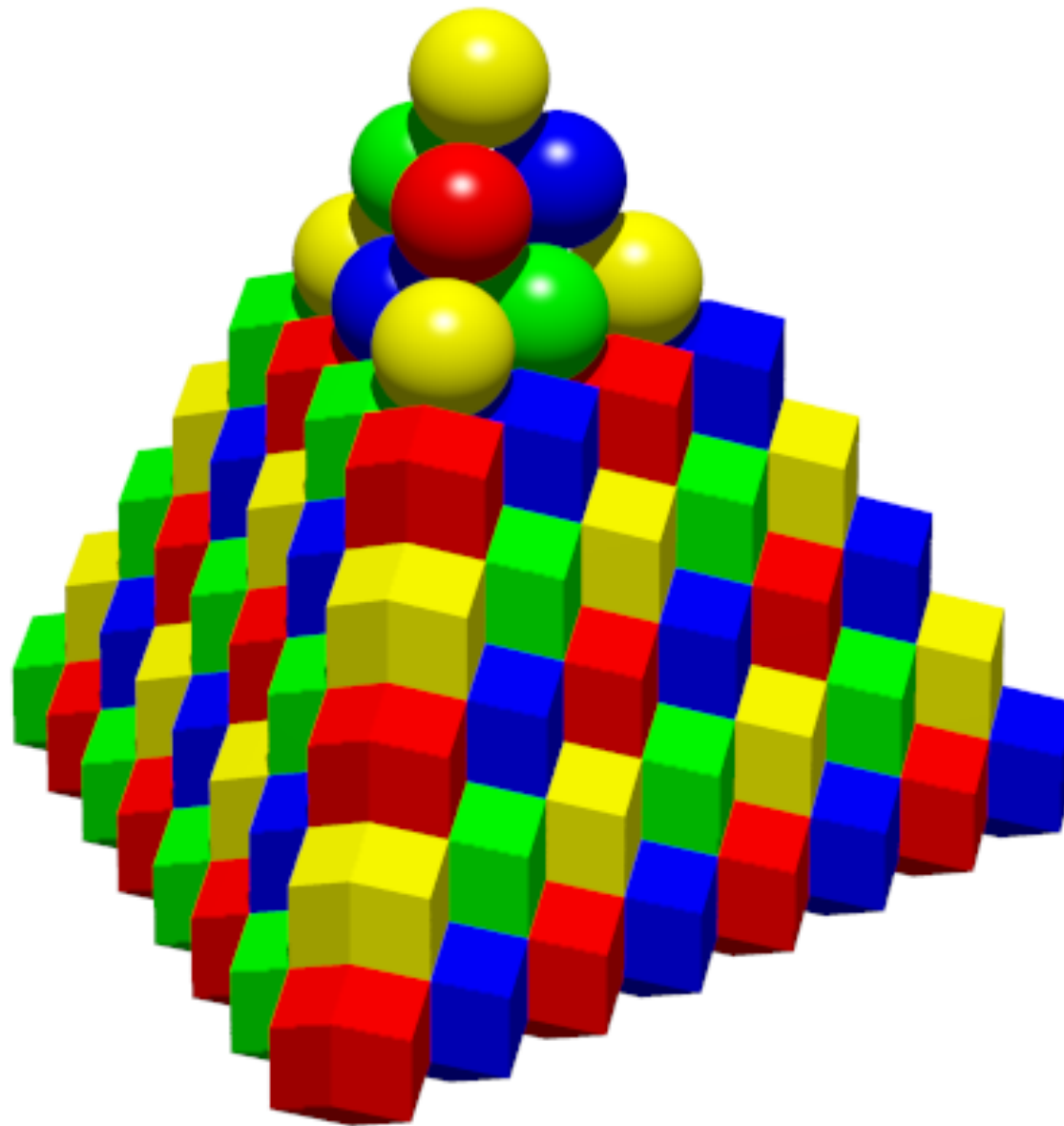


Inkugel

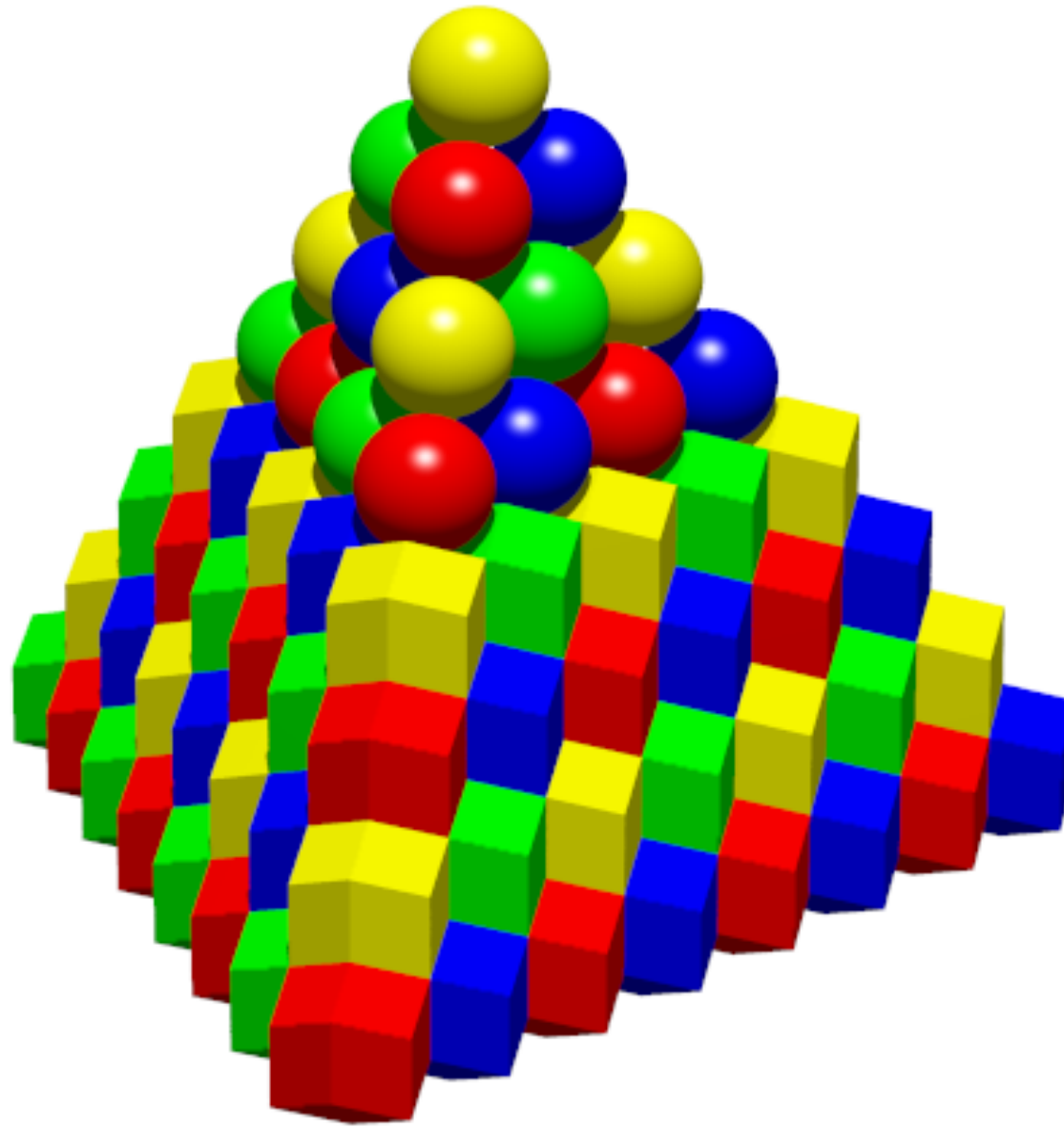
Das Rhombendodekaeder



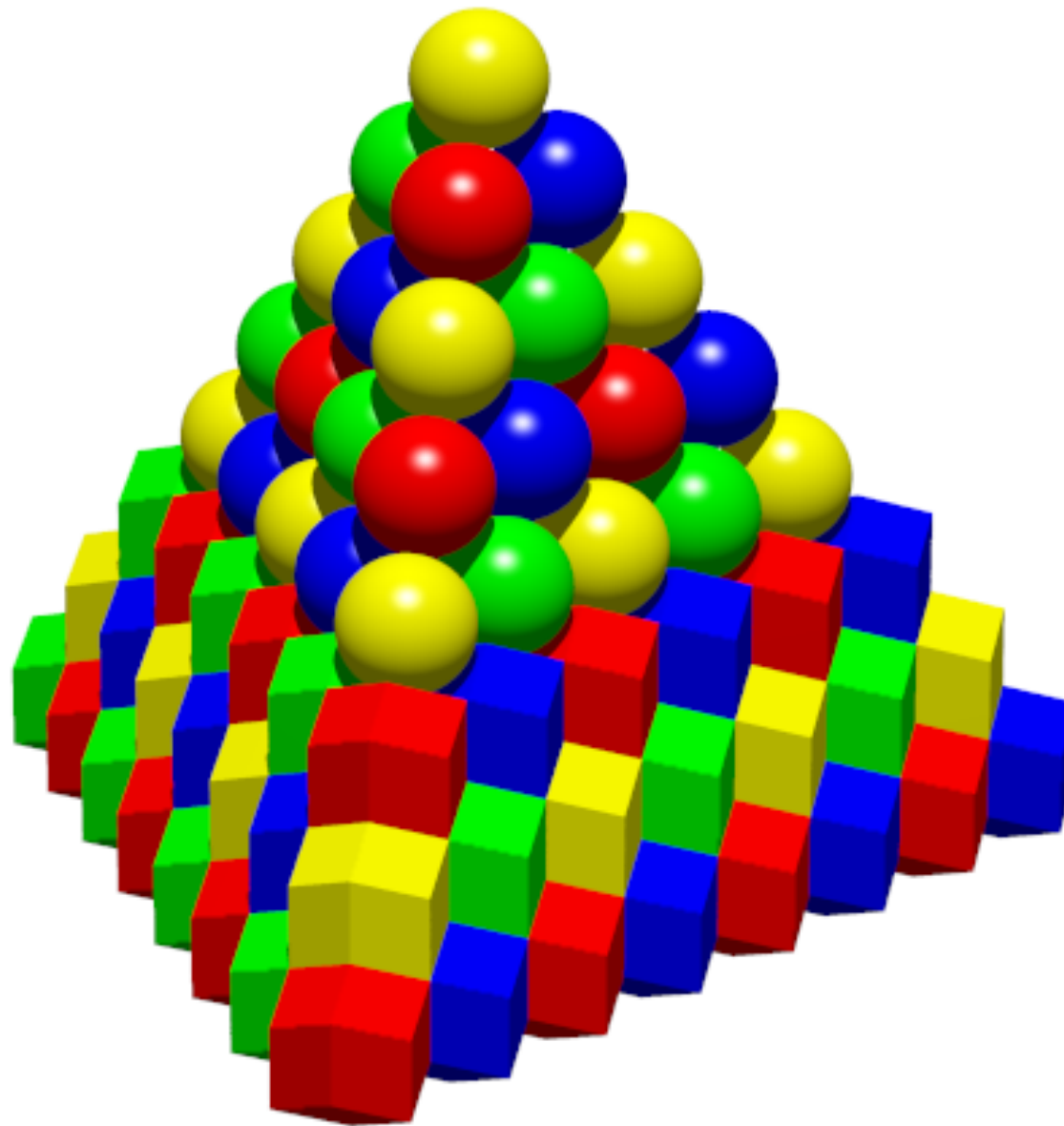
Das Rhombendodekaeder



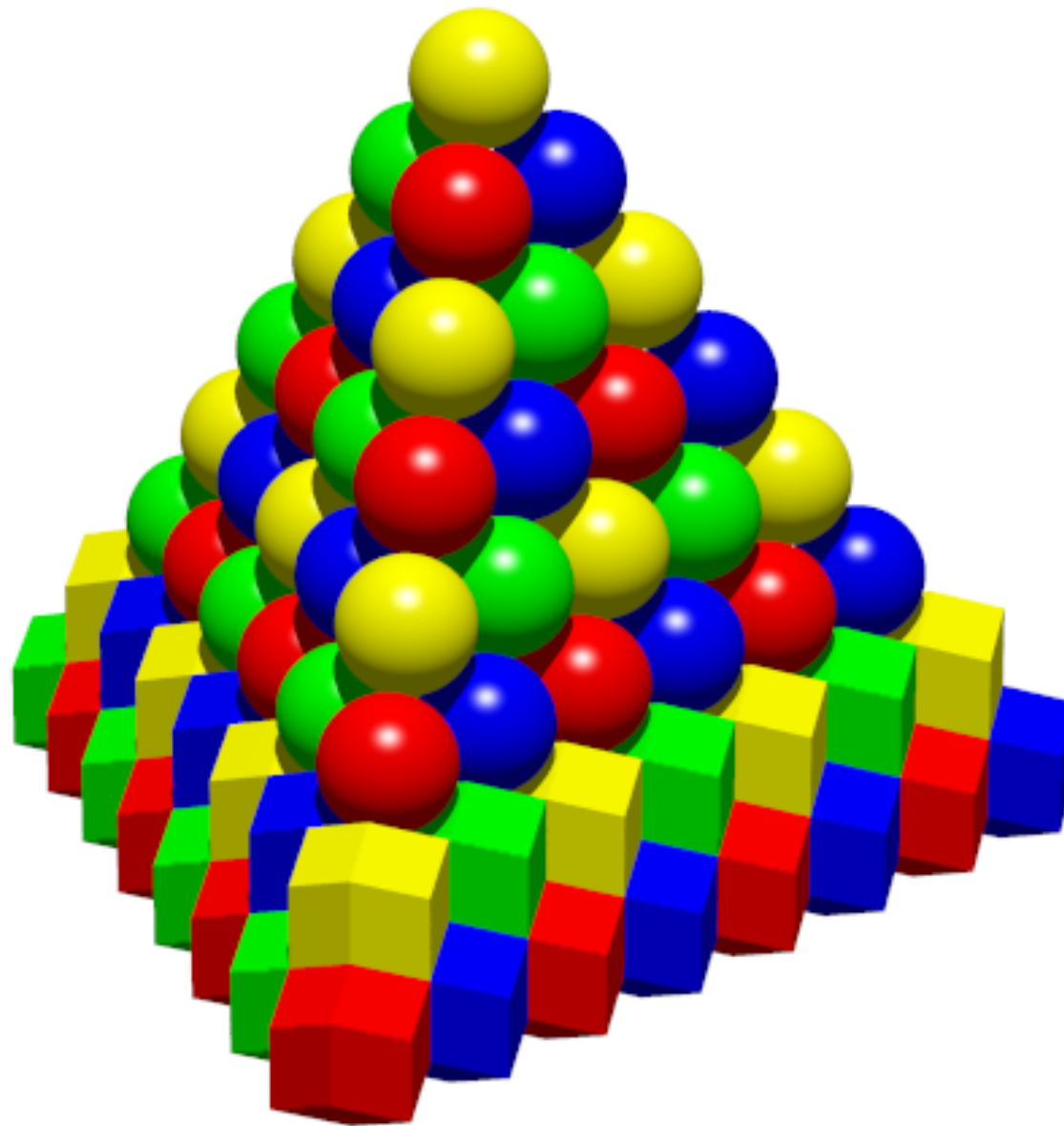
Das Rhombendodekaeder



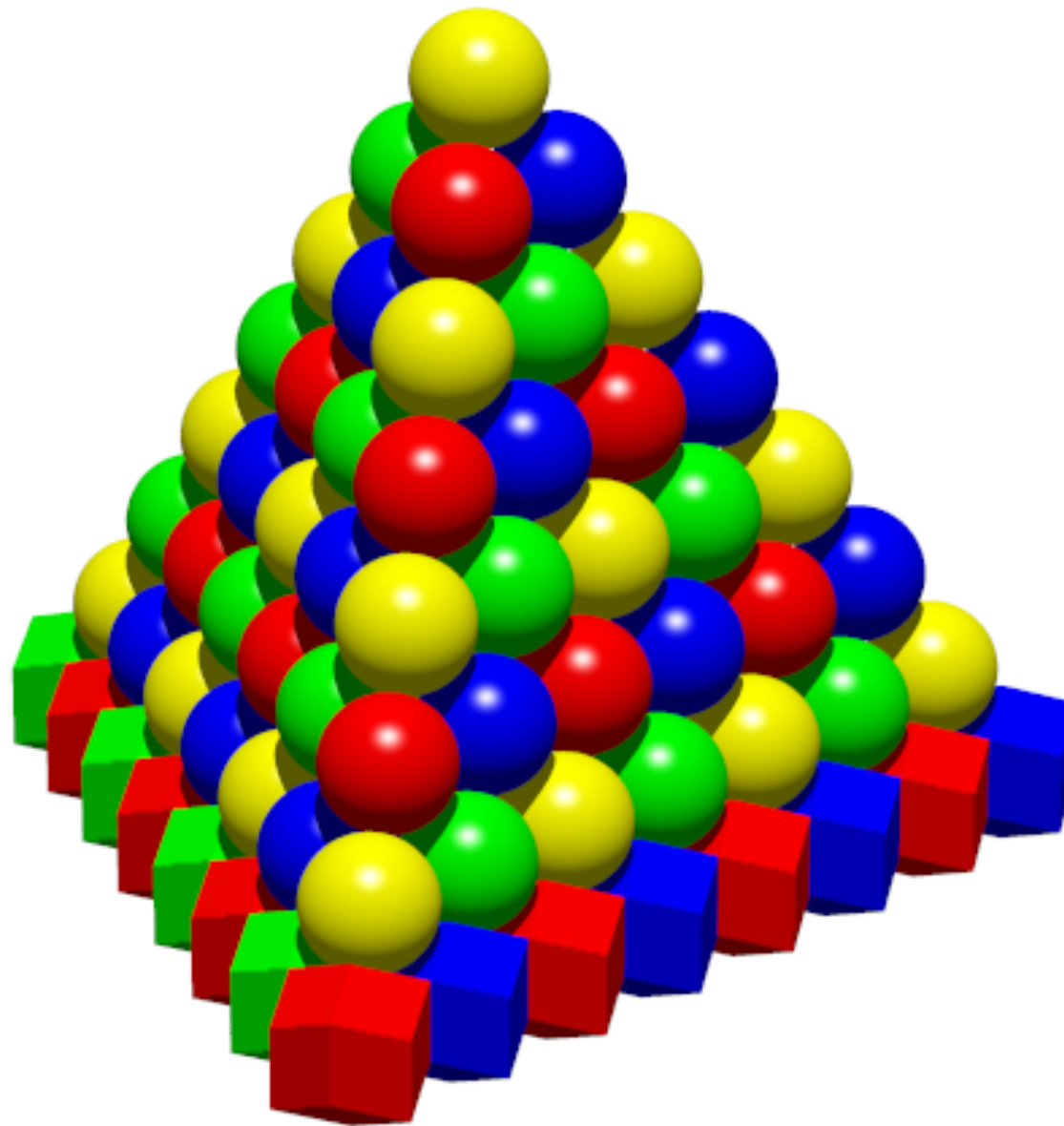
Das Rhombendodekaeder



Das Rhombendodekaeder

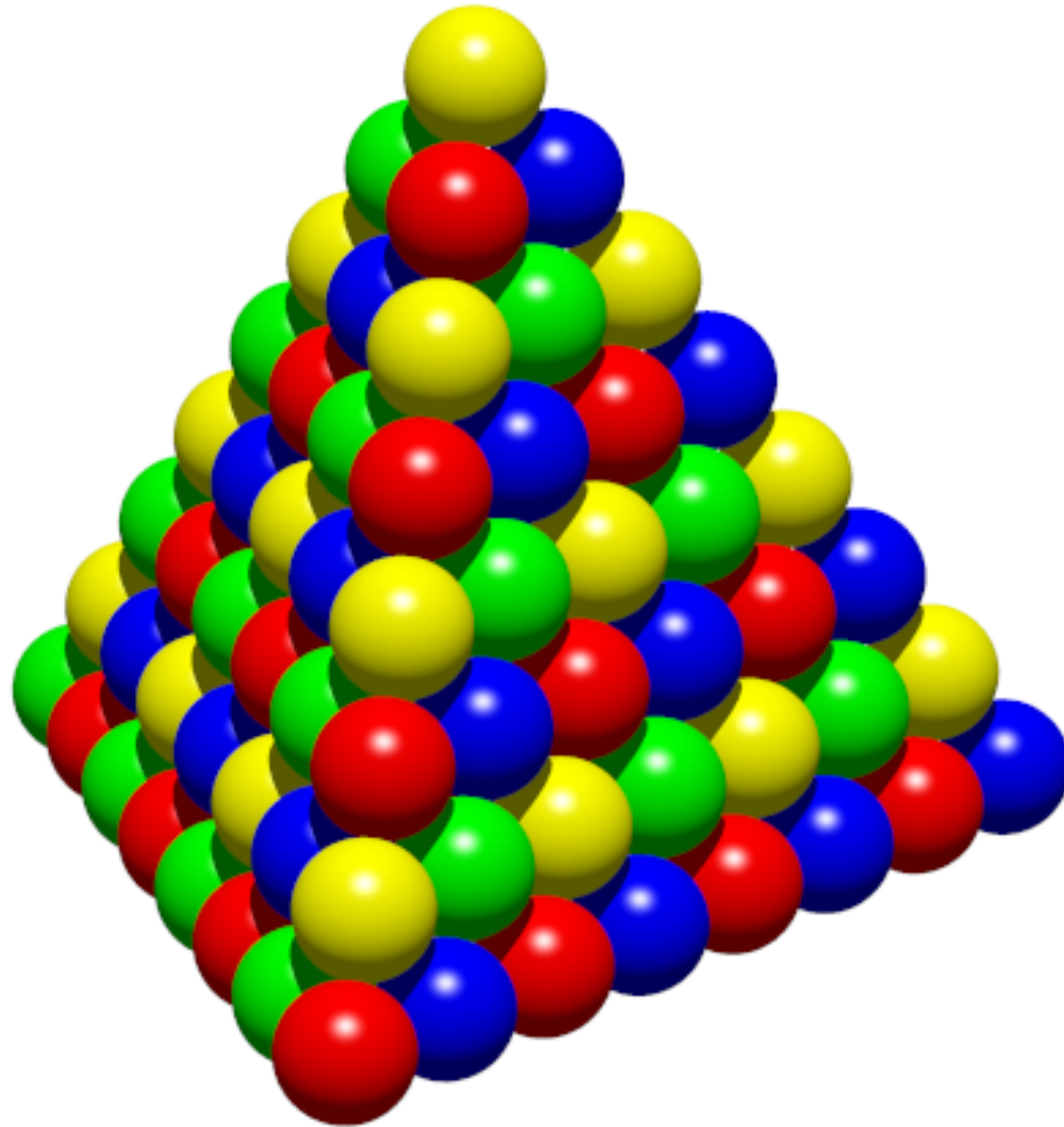


Das Rhombendodekaeder



Das Rhombendodekaeder

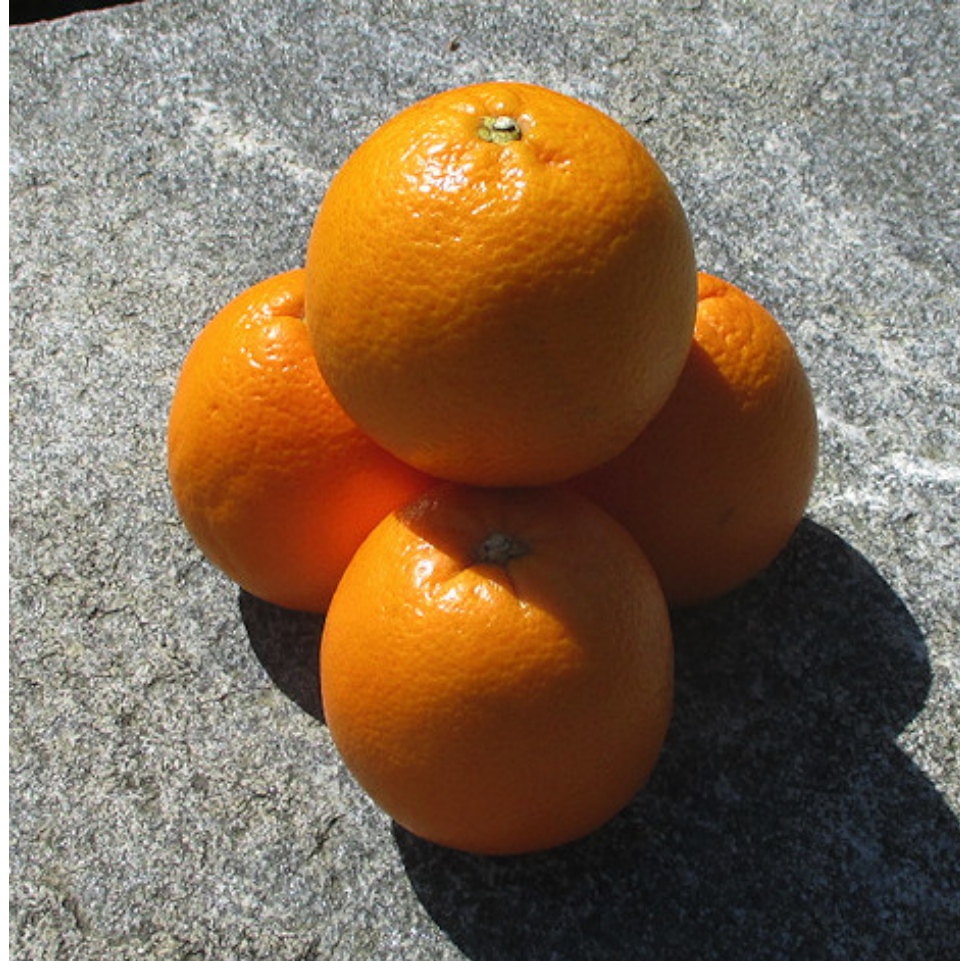
Tetraeder



Dichteste Kugelpackung (Kepler 1611, Hales 1998-2014)

Das Rhombendodekaeder

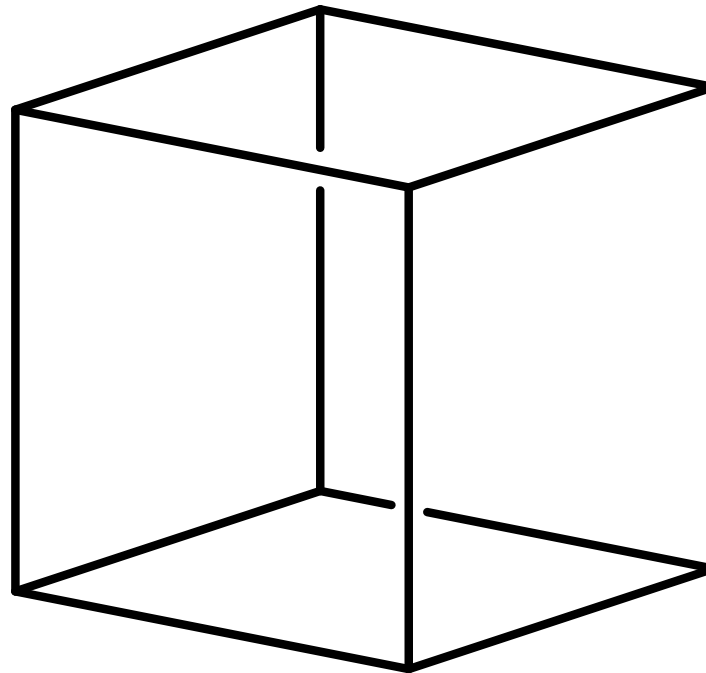
Tetraeder



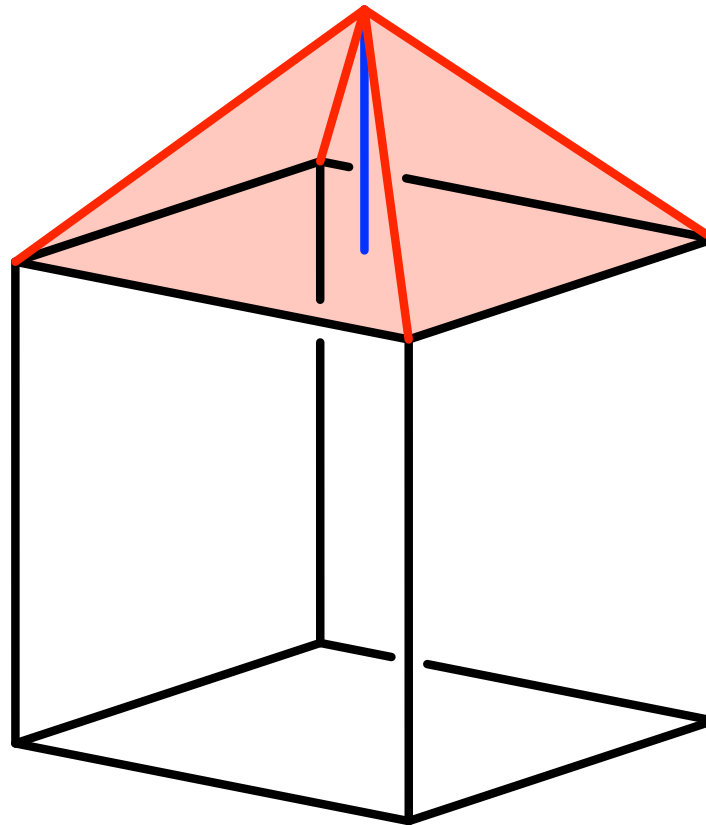
Dichteste Kugelpackung (Kepler 1611, Hales 1998-2014)

Das Rhombendodekaeder

Würfel als Kern



Das Rhombendodekaeder Pyramide aufsetzen

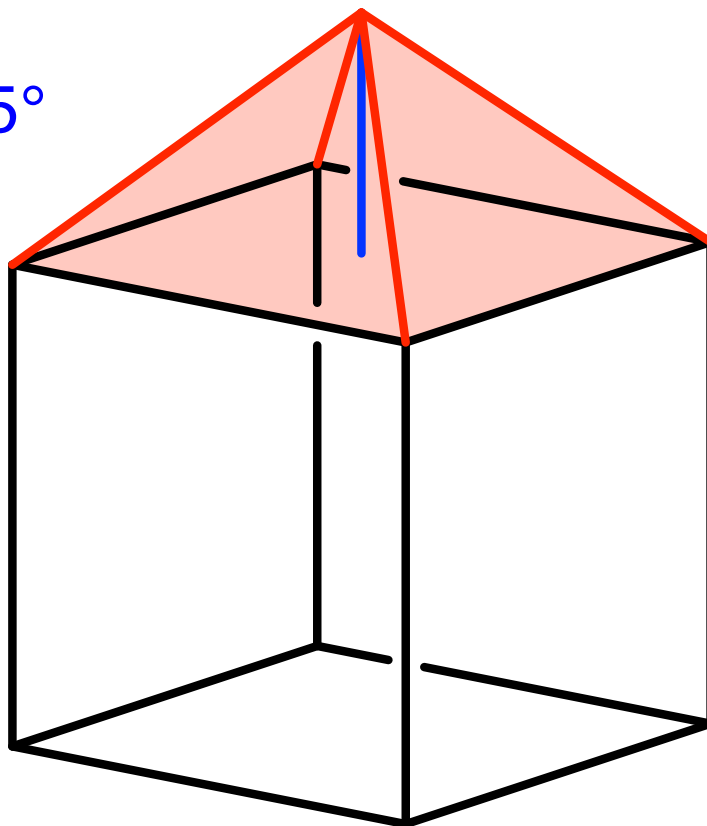


Das Rhombendodekaeder

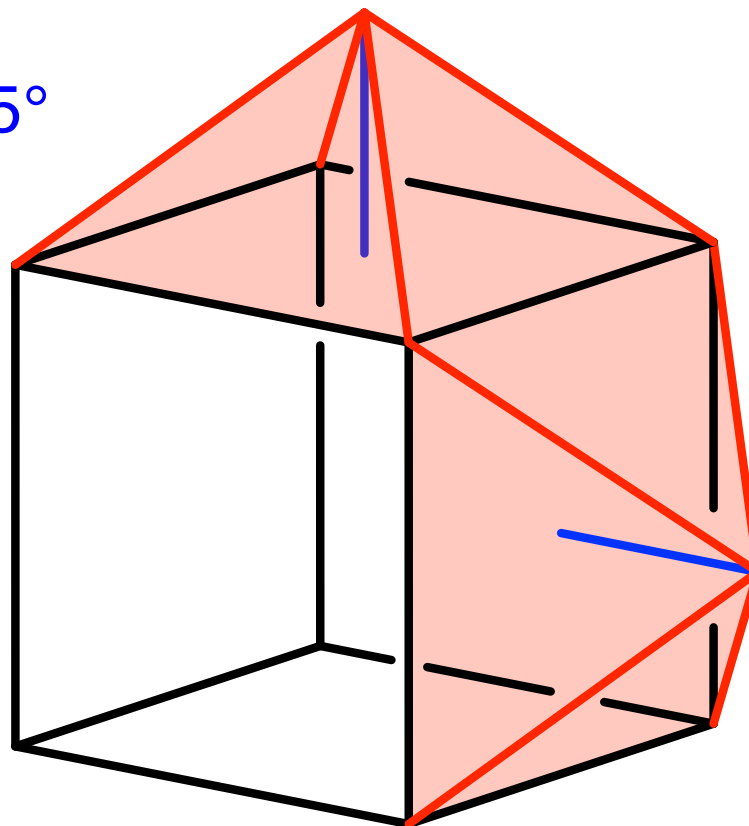
Pyramide aufsetzen

Halbe Höhe

Neigungswinkel 45°



Das Rhombendodekaeder
Pyramide aufsetzen
Halbe Höhe
Neigungswinkel 45°

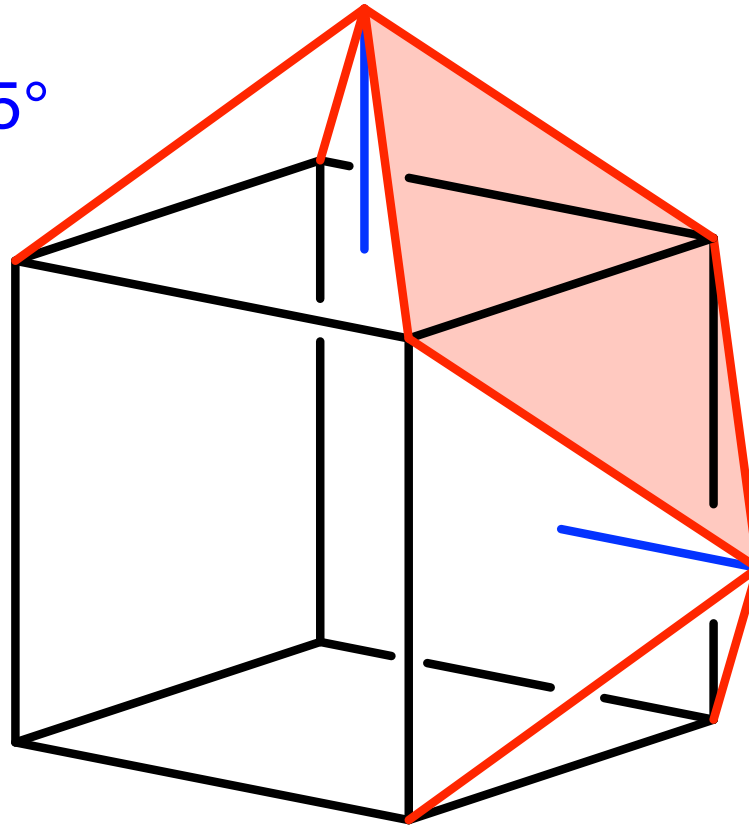


Das Rhombendodekaeder

Pyramide aufsetzen

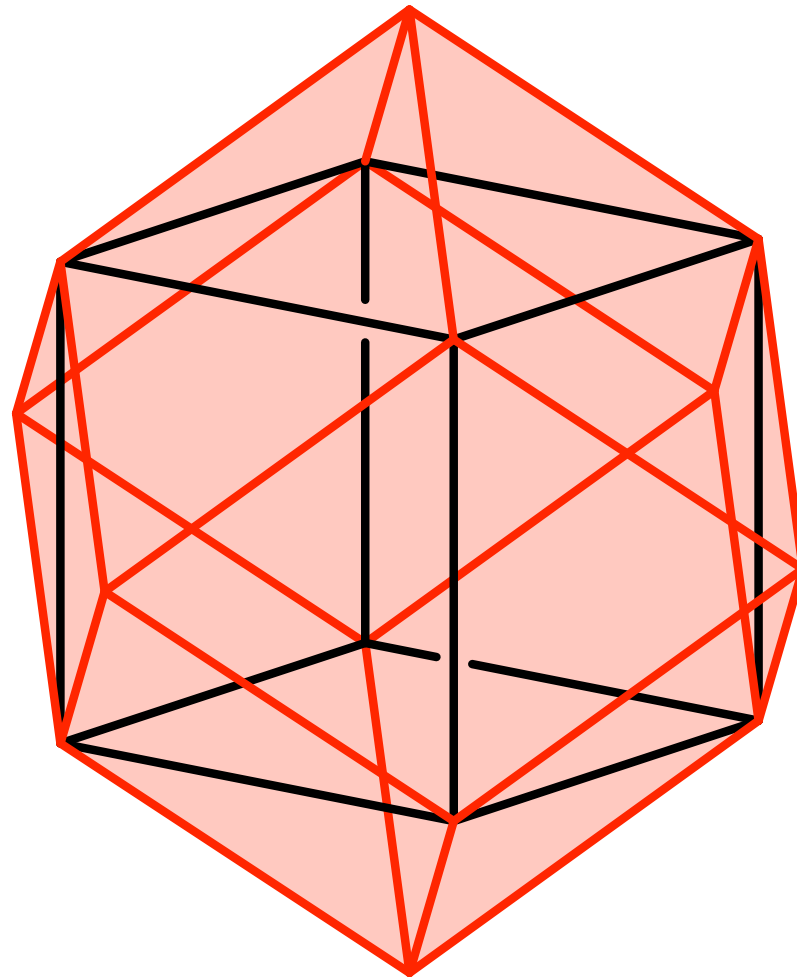
Halbe Höhe

Neigungswinkel 45°

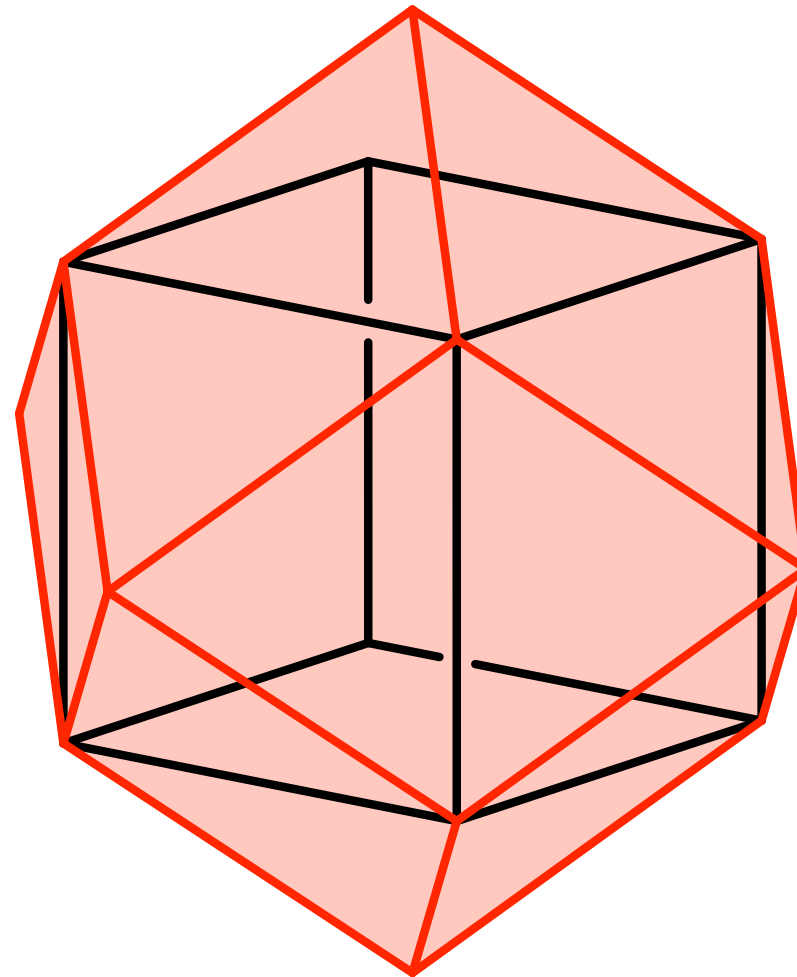


Rhombus mit Diagonalenverhältnis $1:\sqrt{2}$

Das Rhombendodekaeder
Insgesamt 6 Pyramiden ansetzen

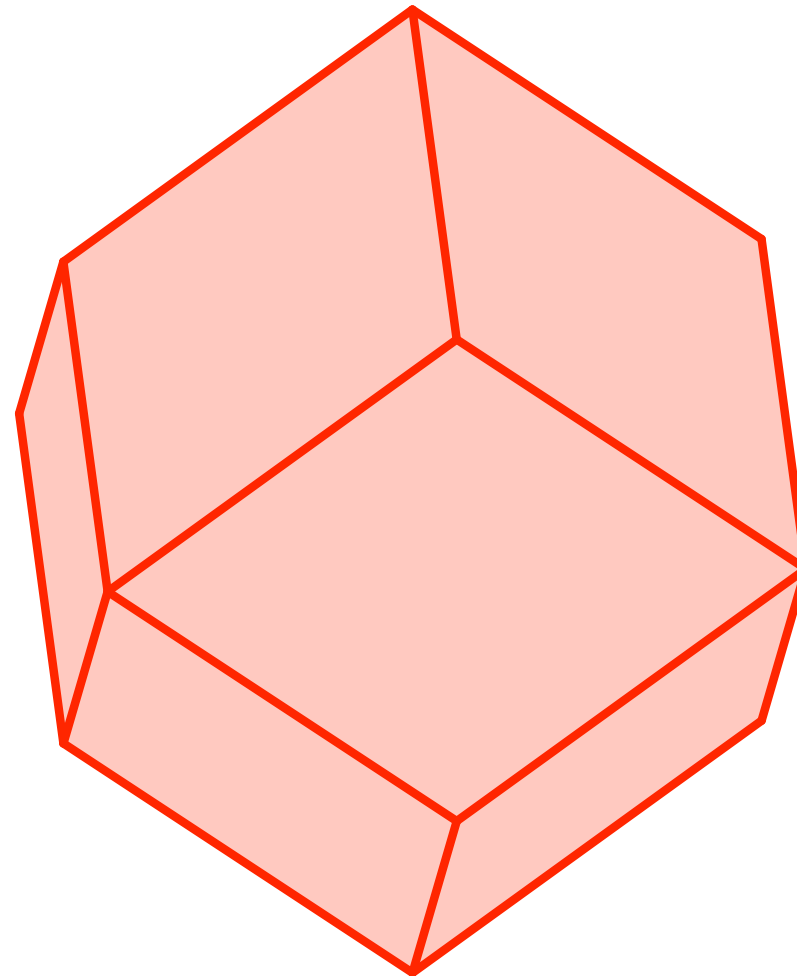


Das Rhombendodekaeder
Insgesamt 6 Pyramiden ansetzen

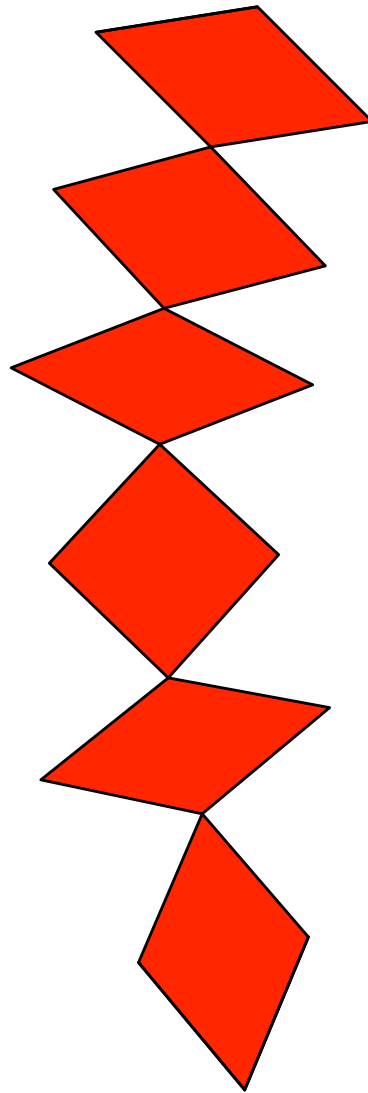


Das Rhombendodekaeder

Kopfgeometrie: Beweis der Raumfüllungseigenschaft

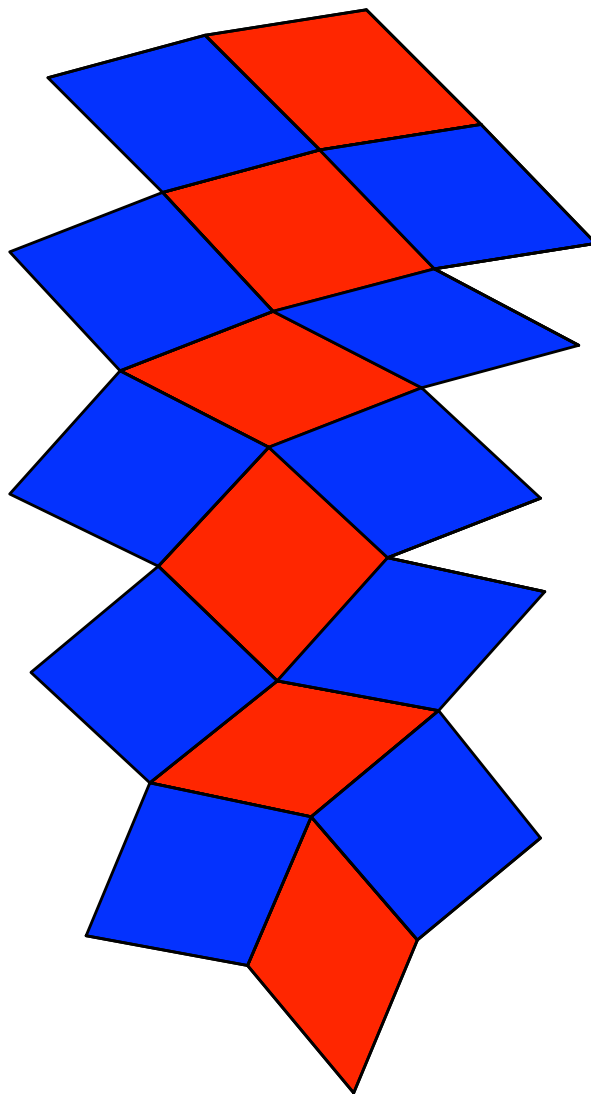


Rhomben gleicher Seitenlänge



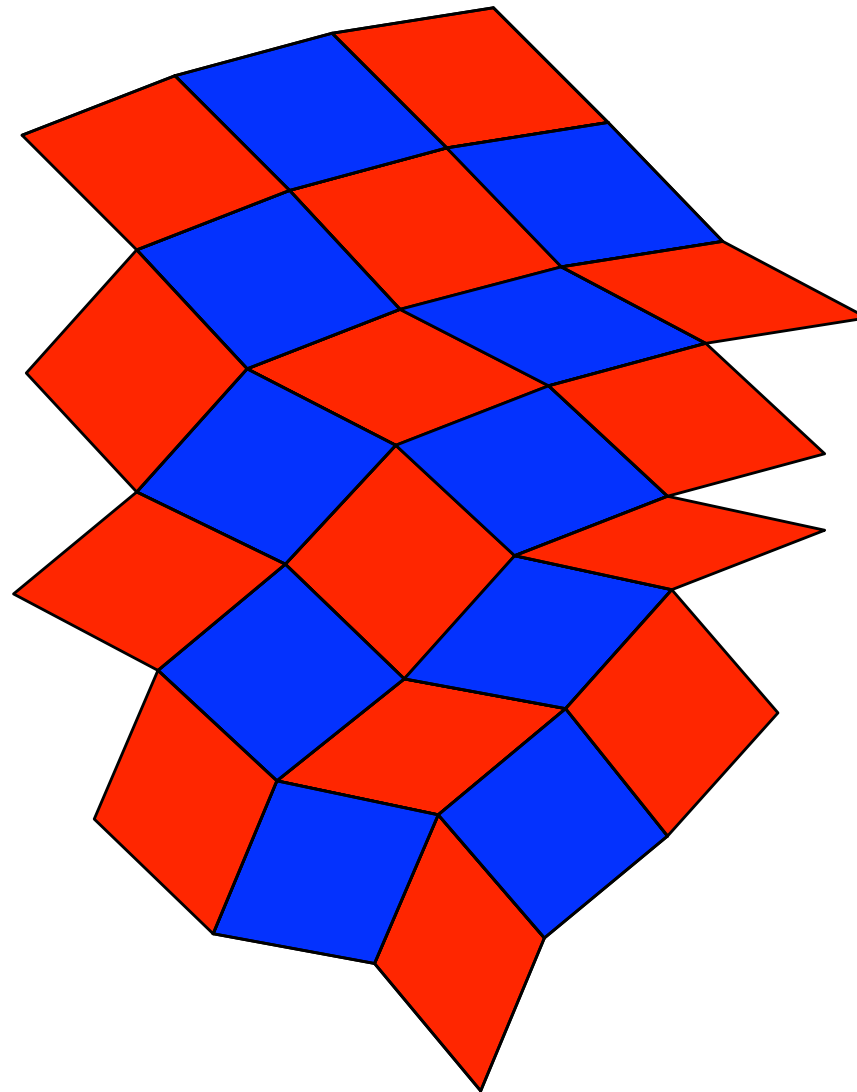
In der Ebene

Rhomben gleicher Seitenlänge

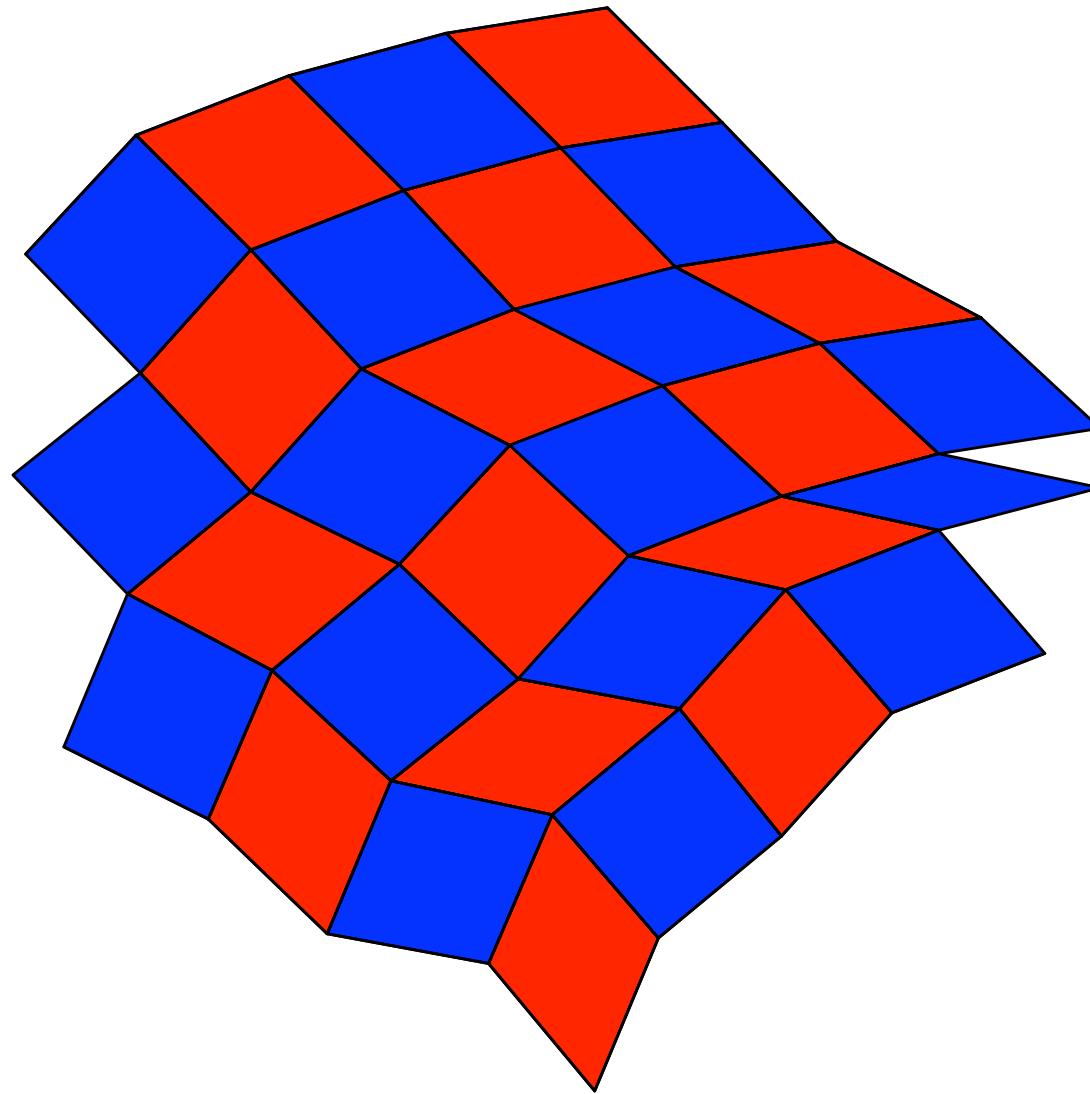


In der Ebene

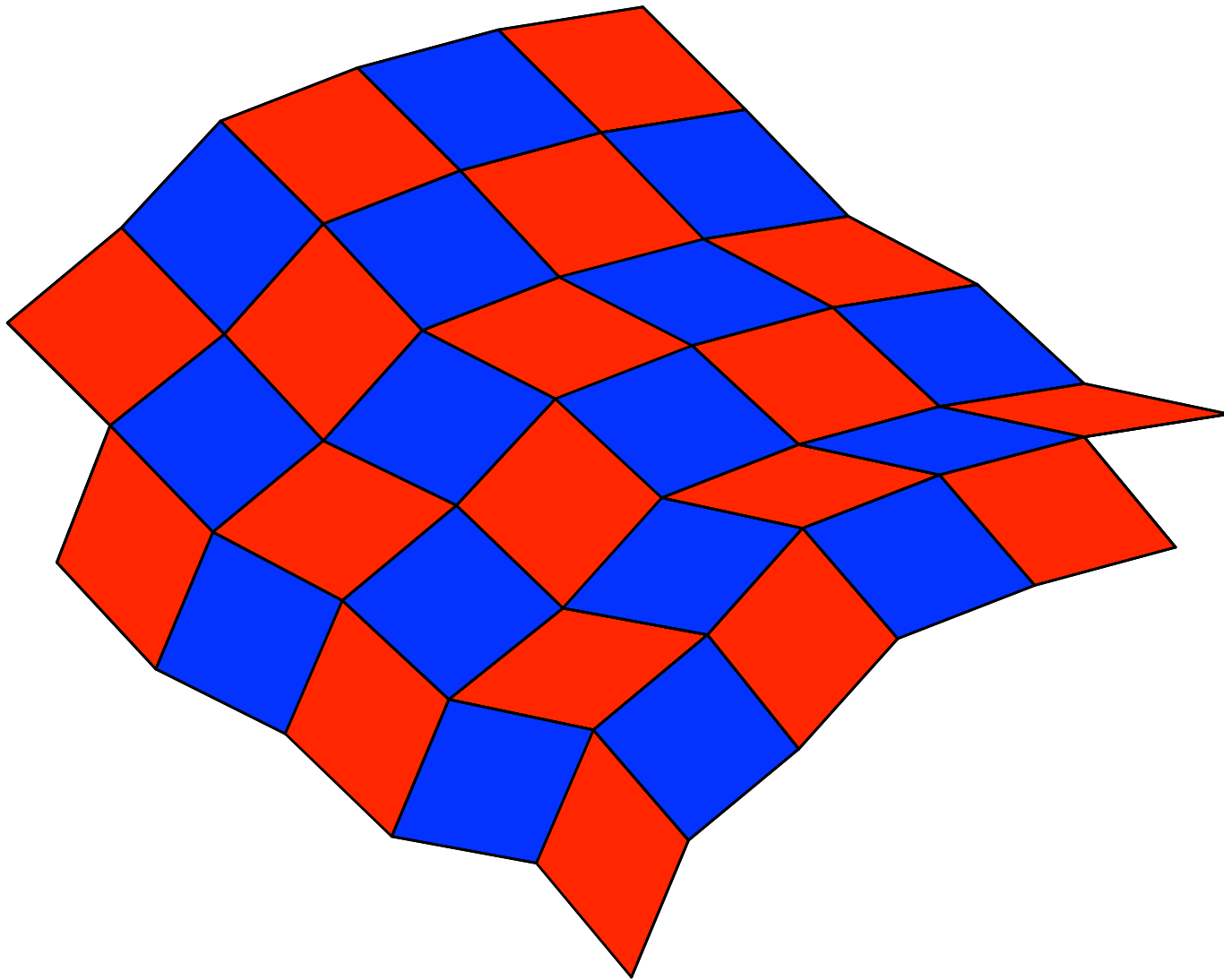
Rhomben gleicher Seitenlänge



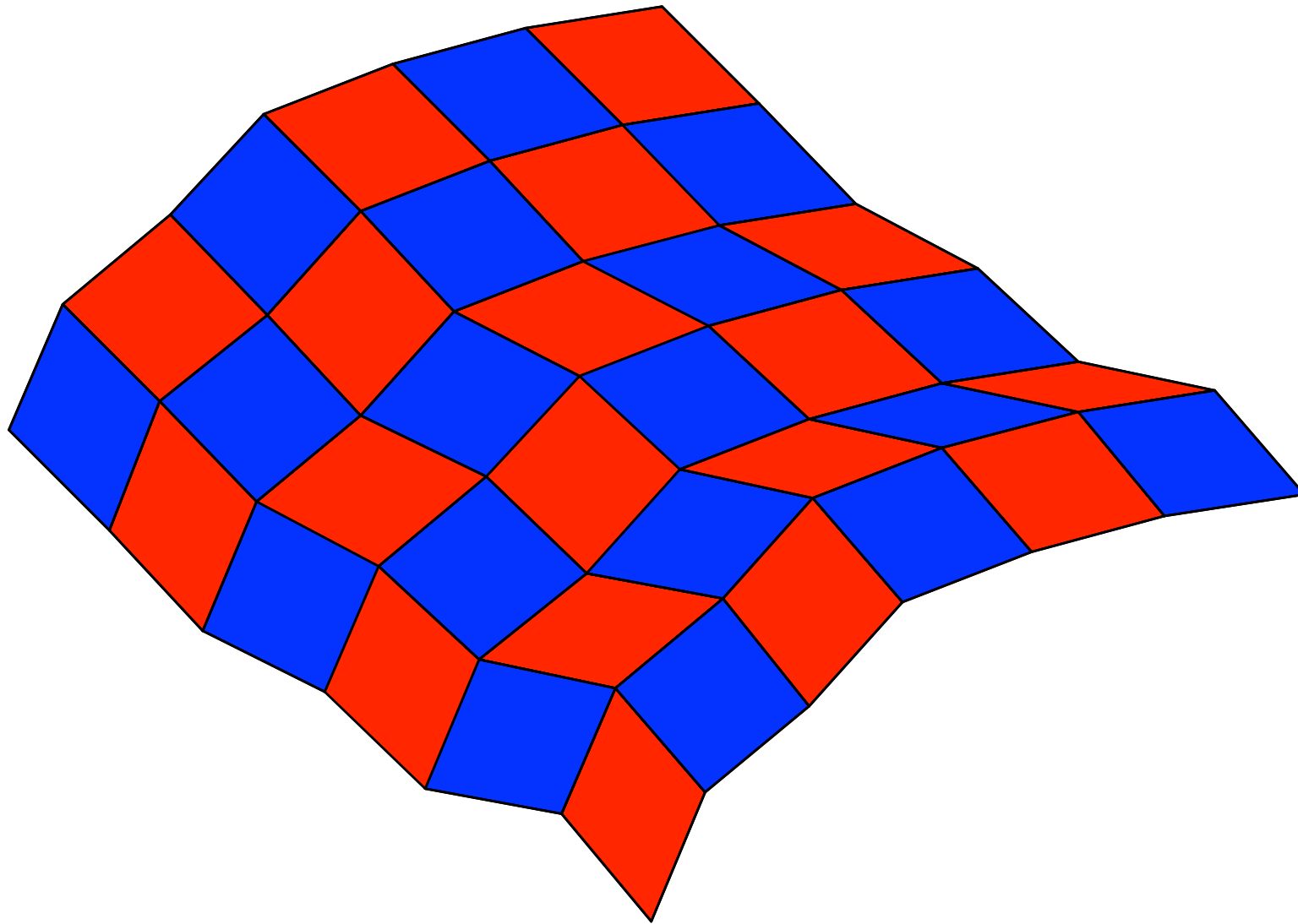
Rhomben gleicher Seitenlänge



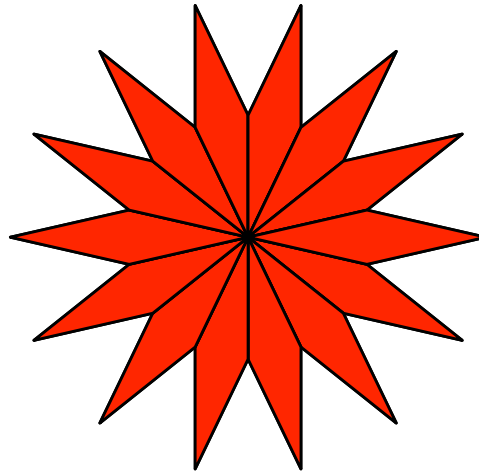
Rhomben gleicher Seitenlänge



Rhomben gleicher Seitenlänge

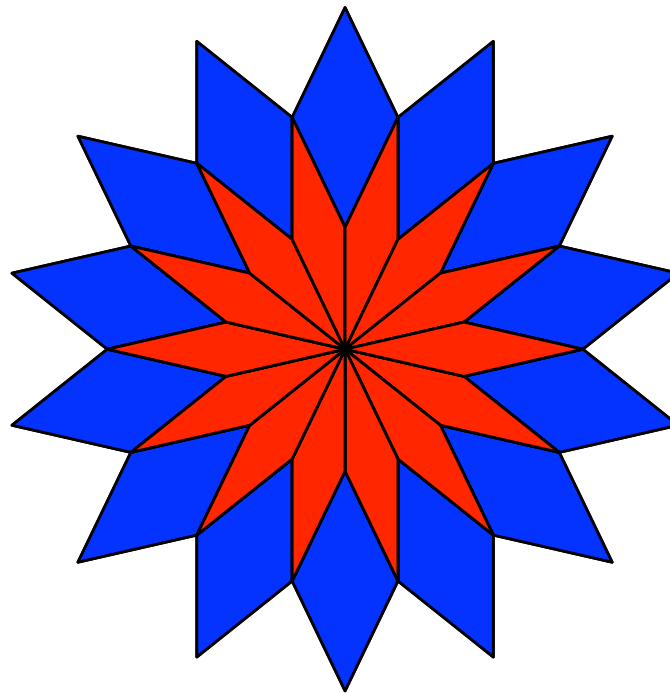


Rhomben gleicher Seitenlänge
Rhombenstern



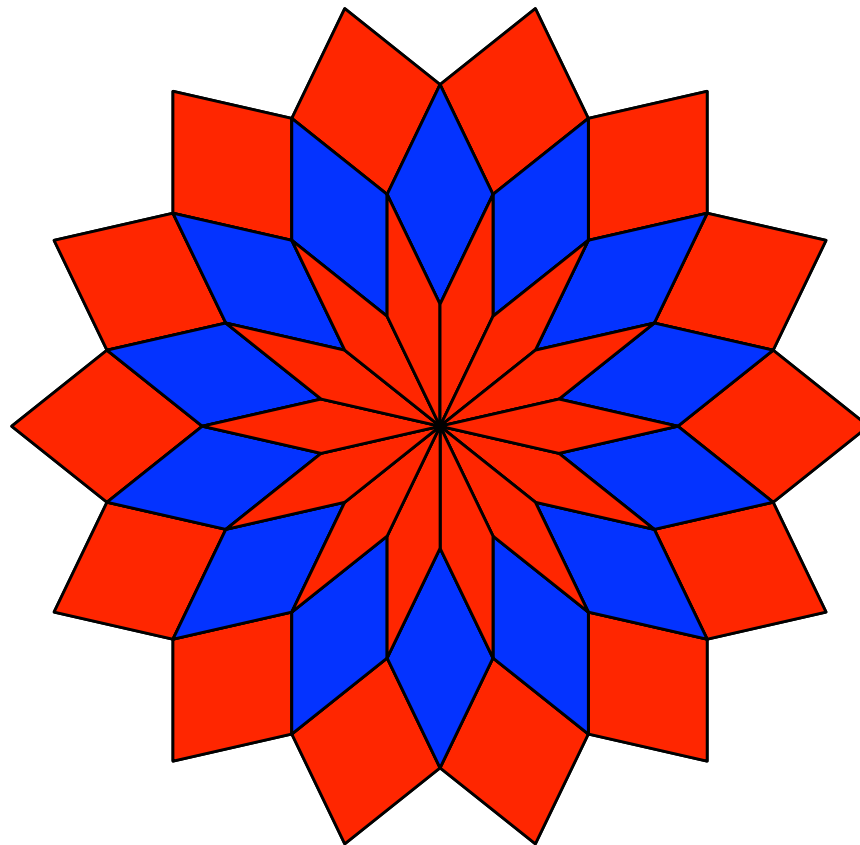
In der Ebene

Rhomben gleicher Seitenlänge
Rhombenstern

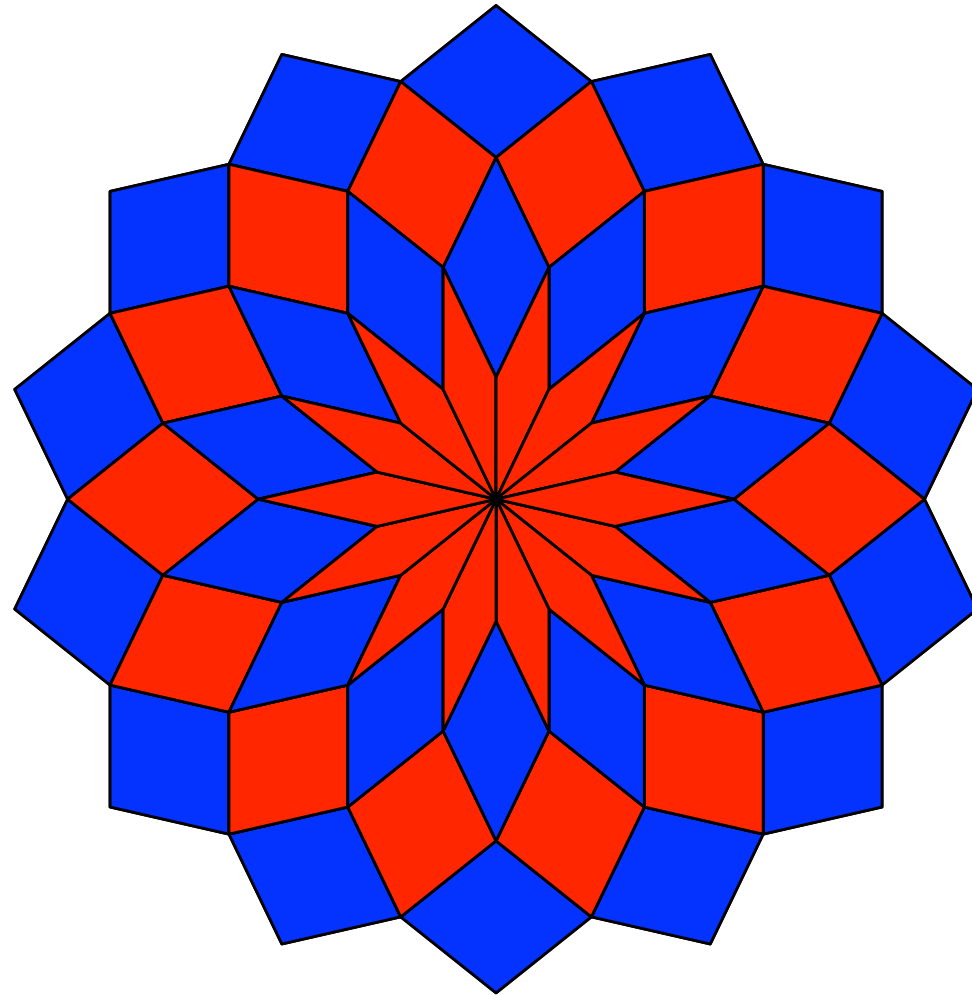


In der Ebene

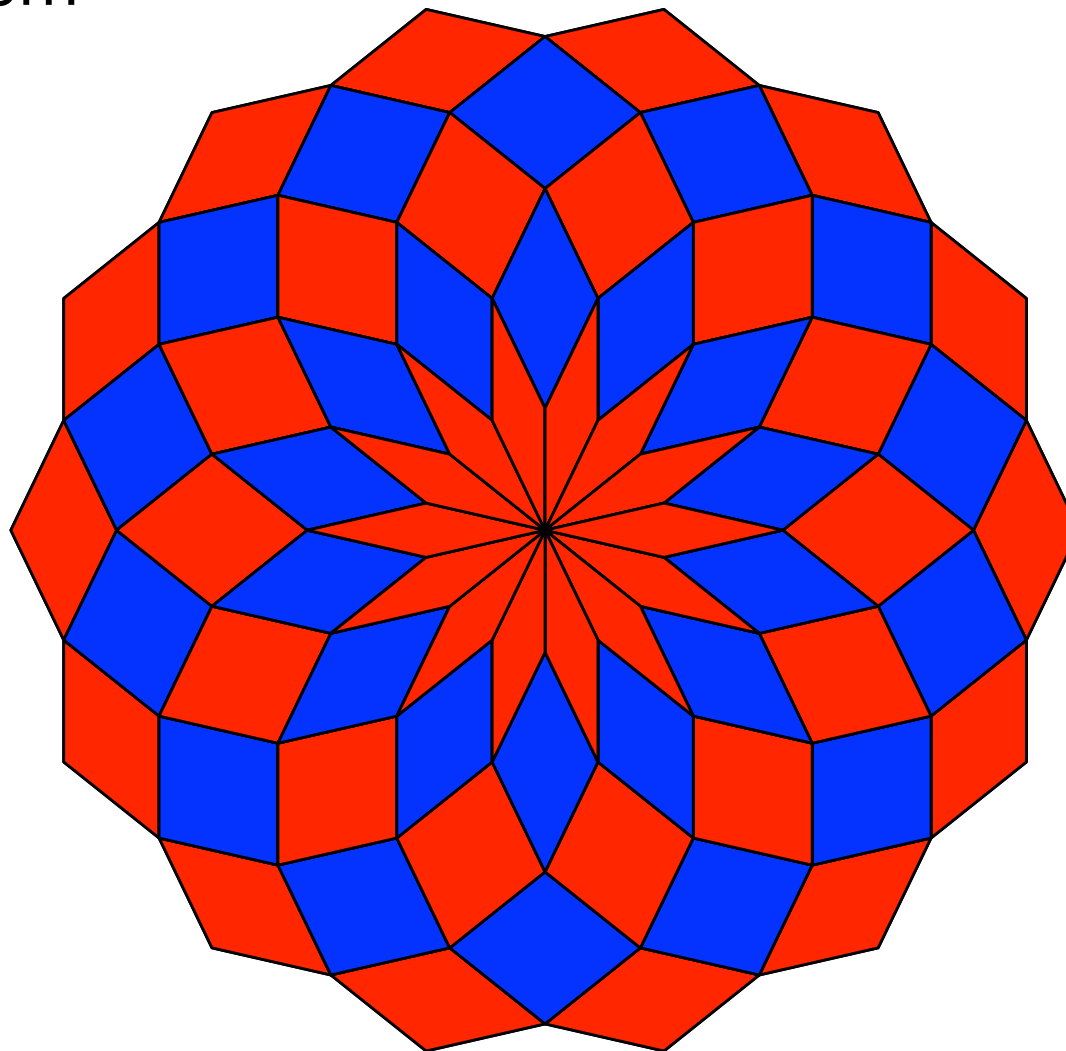
Rhomben gleicher Seitenlänge
Rhombenstern



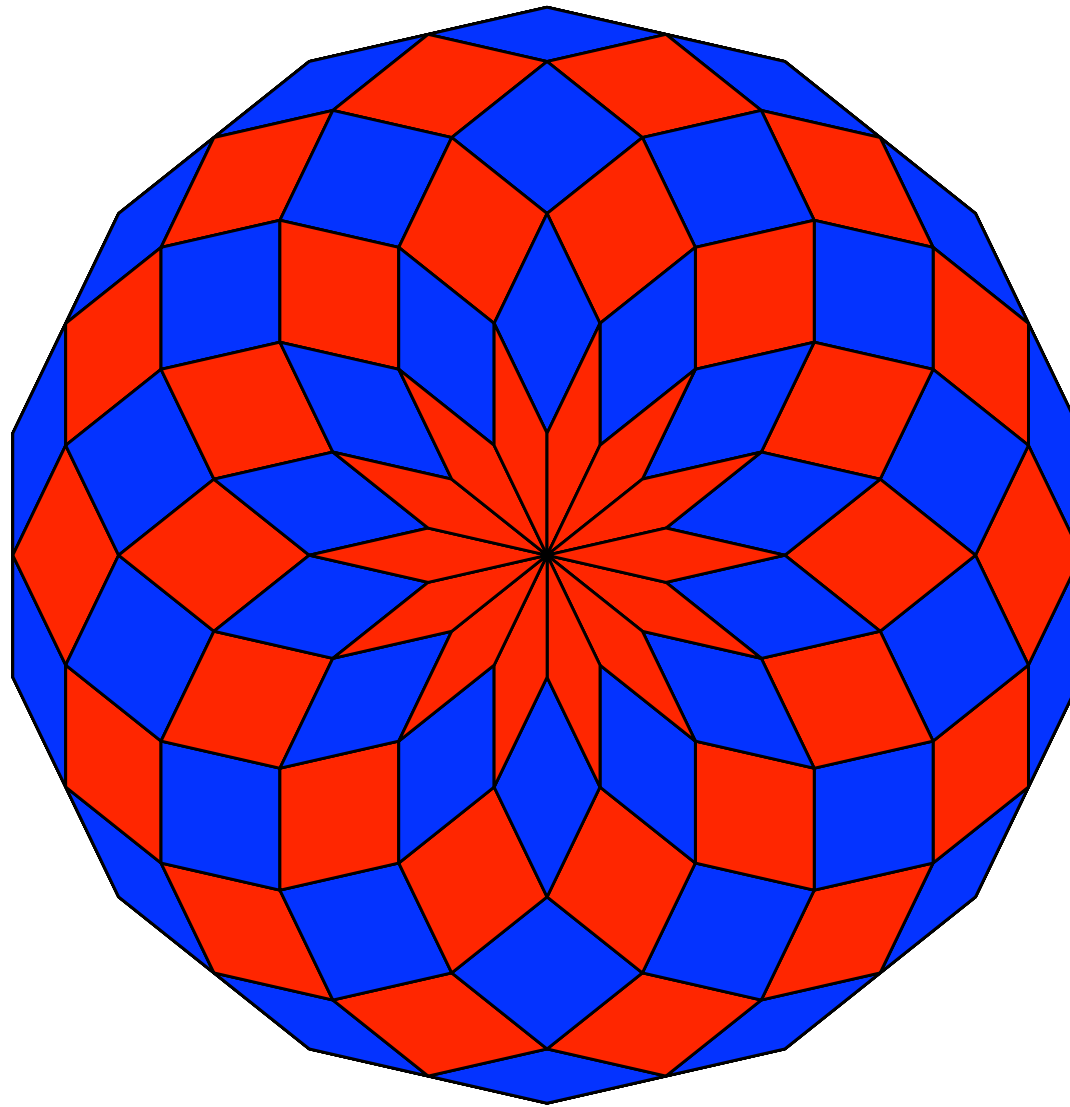
Rhomben gleicher Seitenlänge
Rhombenstern



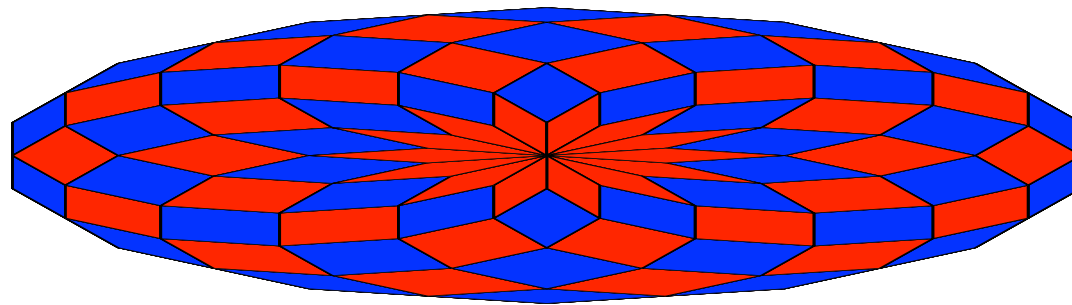
Rhomben gleicher Seitenlänge
Rhombenstern



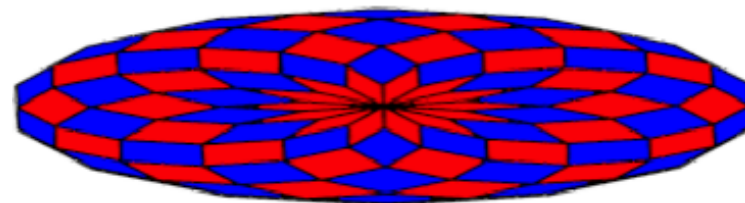
Rhomben gleicher Seitenlänge



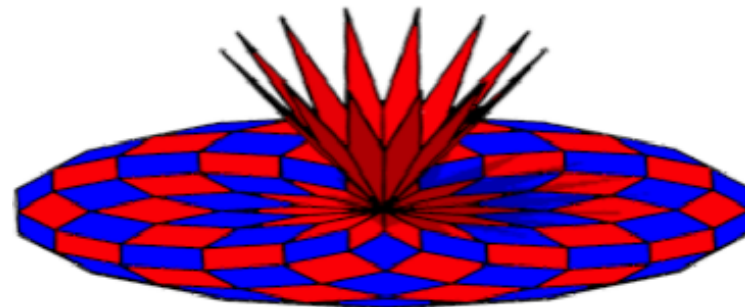
Rhomben gleicher Seitenlänge



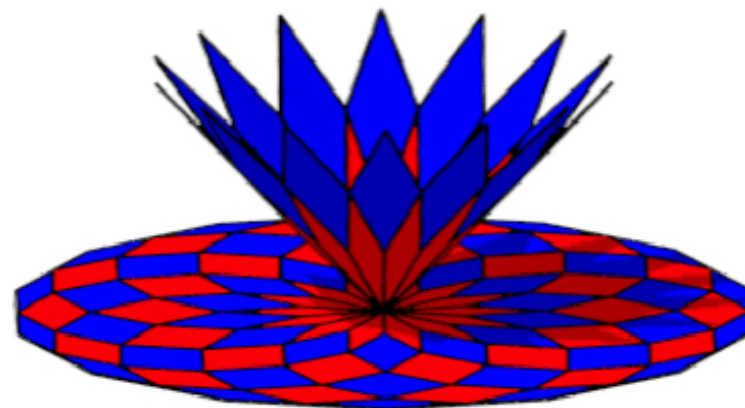
Rhomben gleicher Seitenlänge



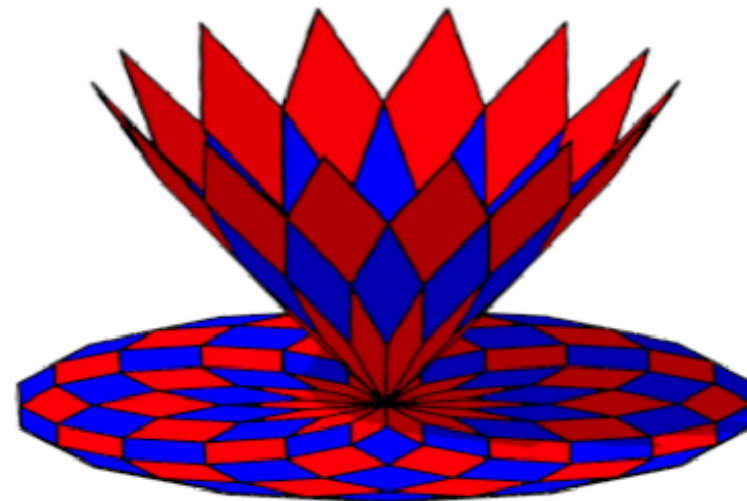
Rhomben gleicher Seitenlänge



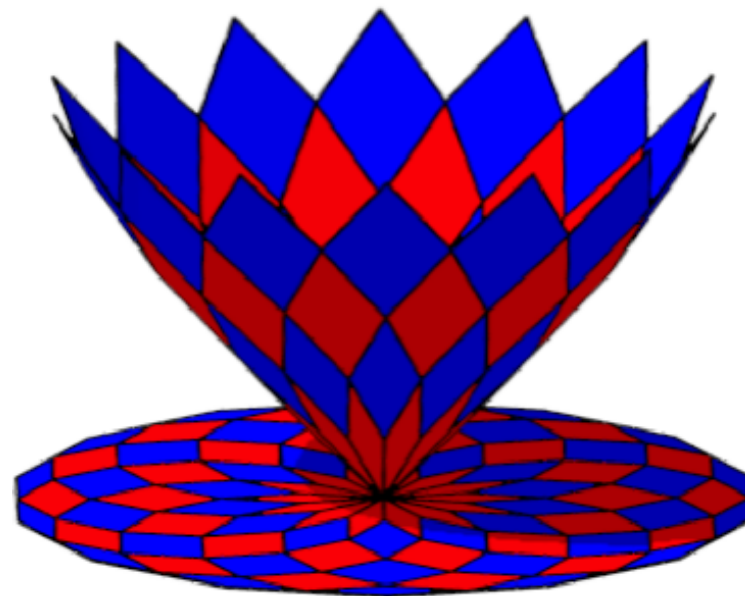
Rhomben gleicher Seitenlänge



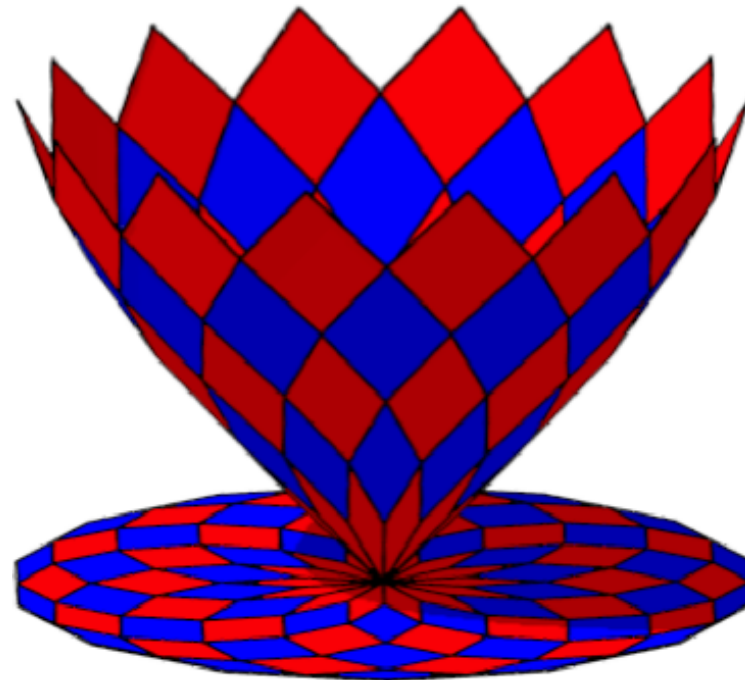
Rhomben gleicher Seitenlänge



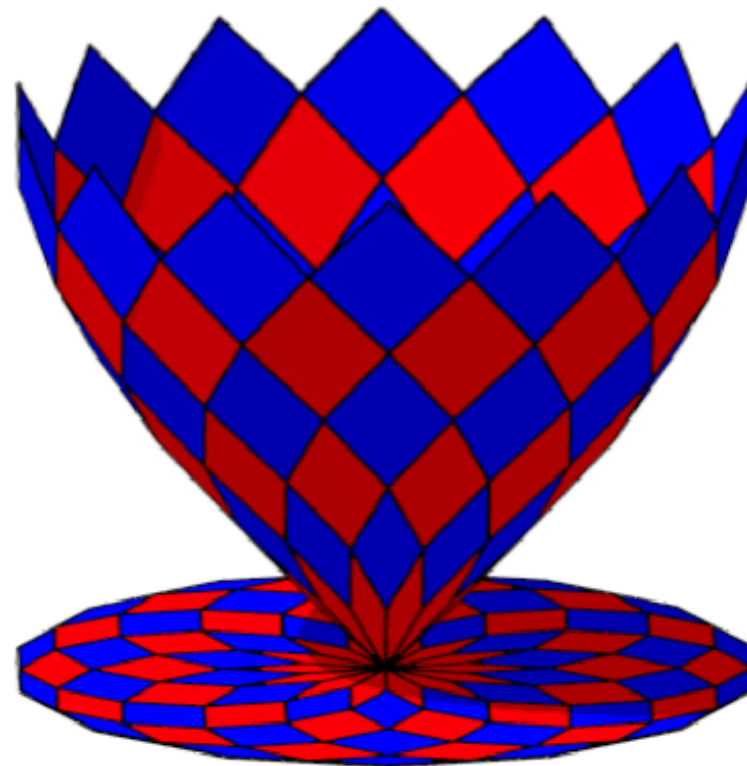
Rhomben gleicher Seitenlänge



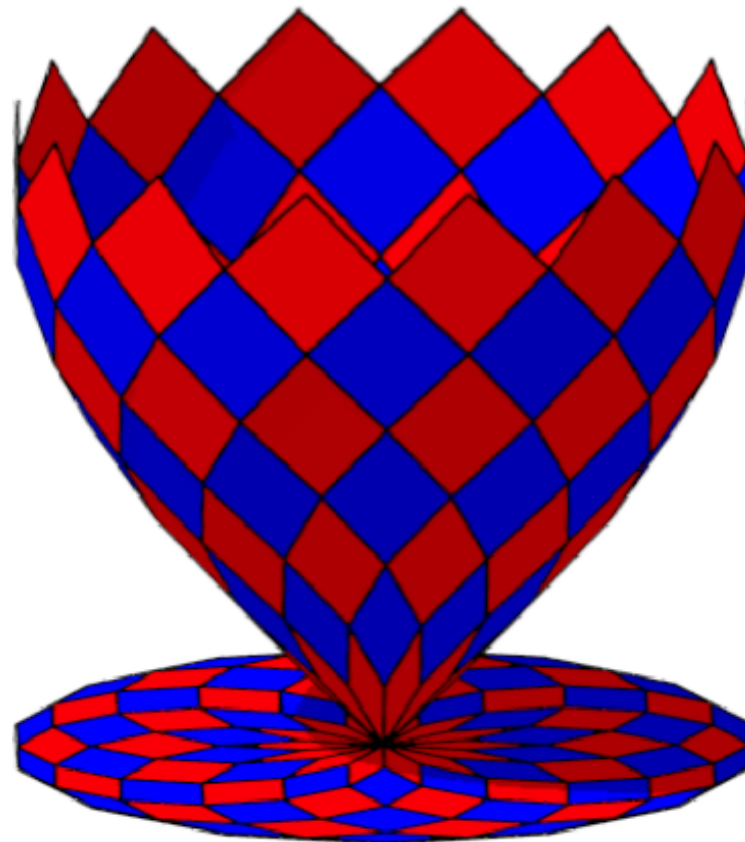
Rhomben gleicher Seitenlänge



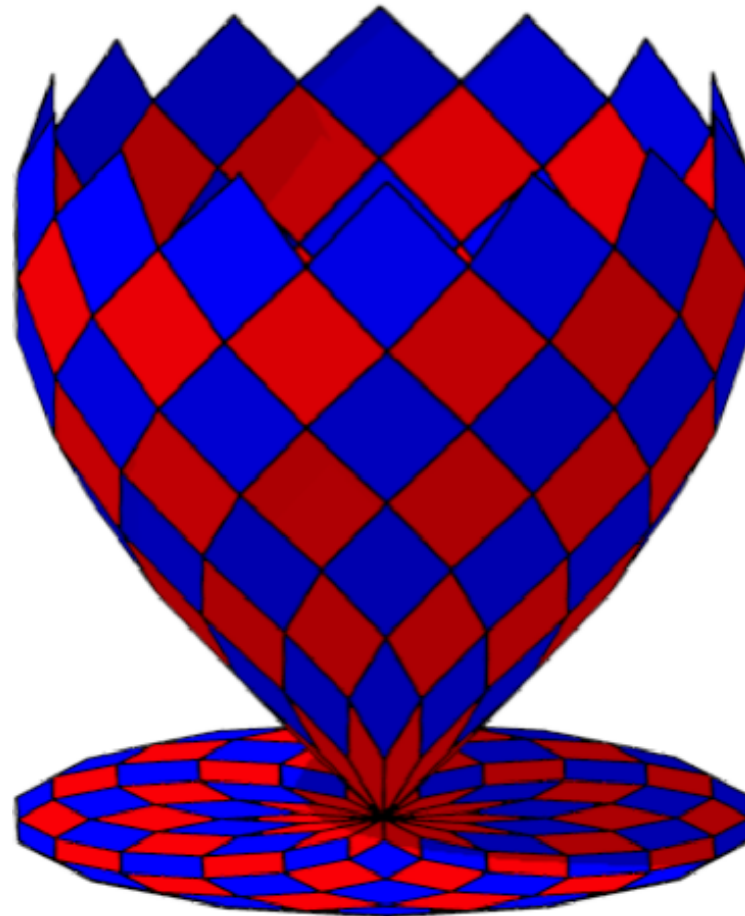
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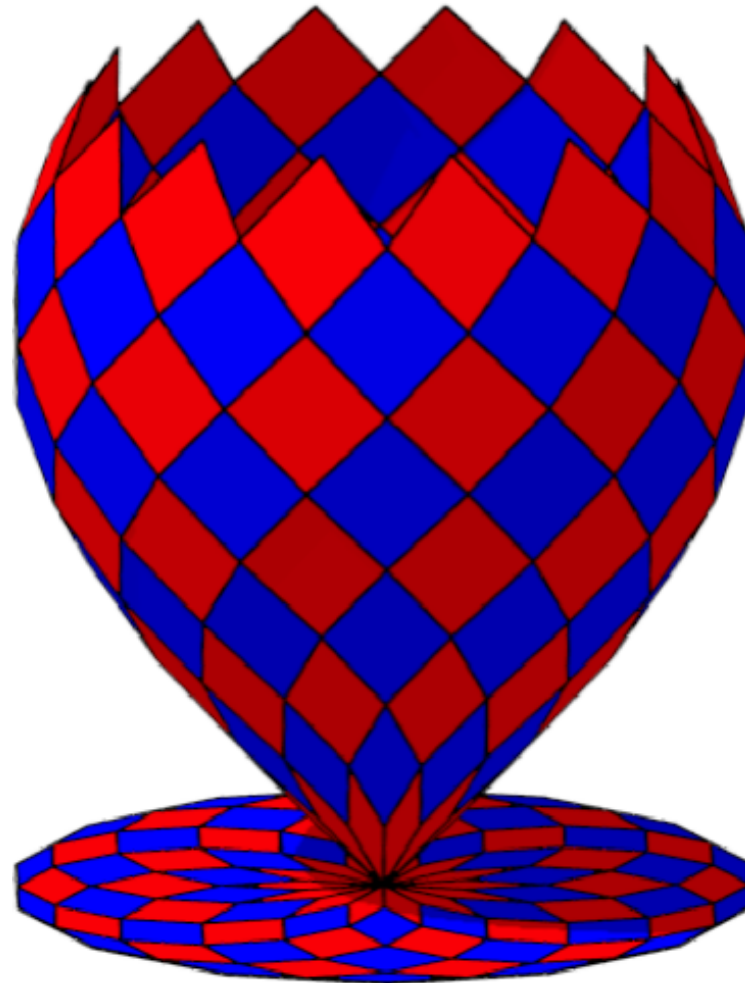
Rhomben gleicher Seitenlänge



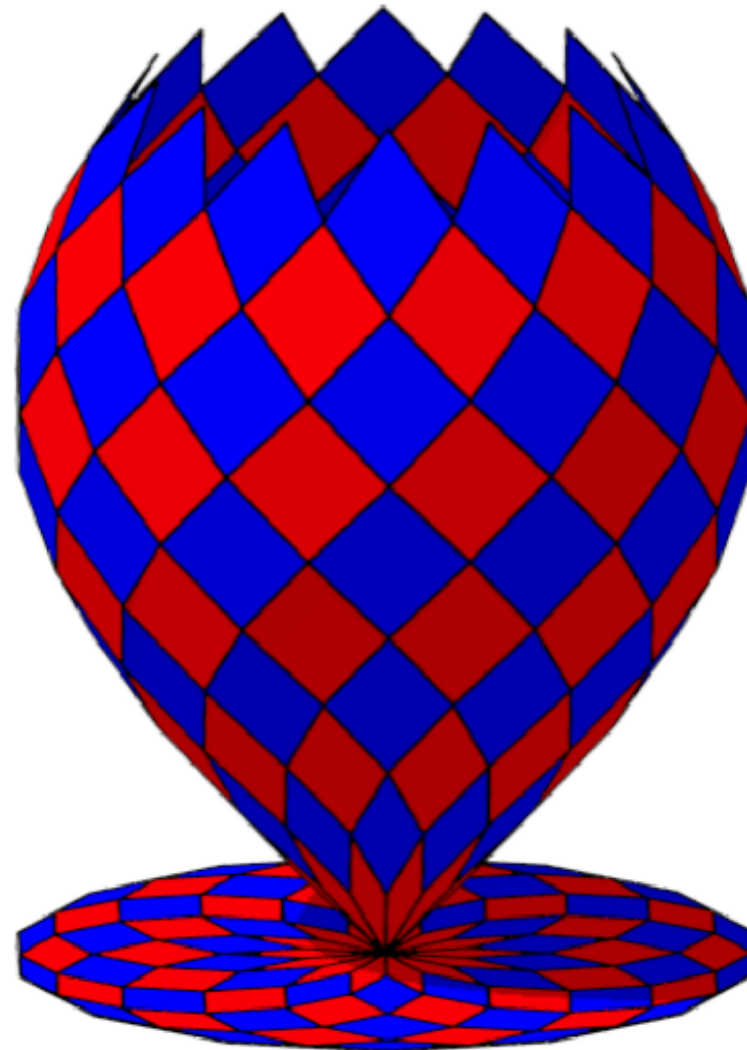
Rhomben gleicher Seitenlänge



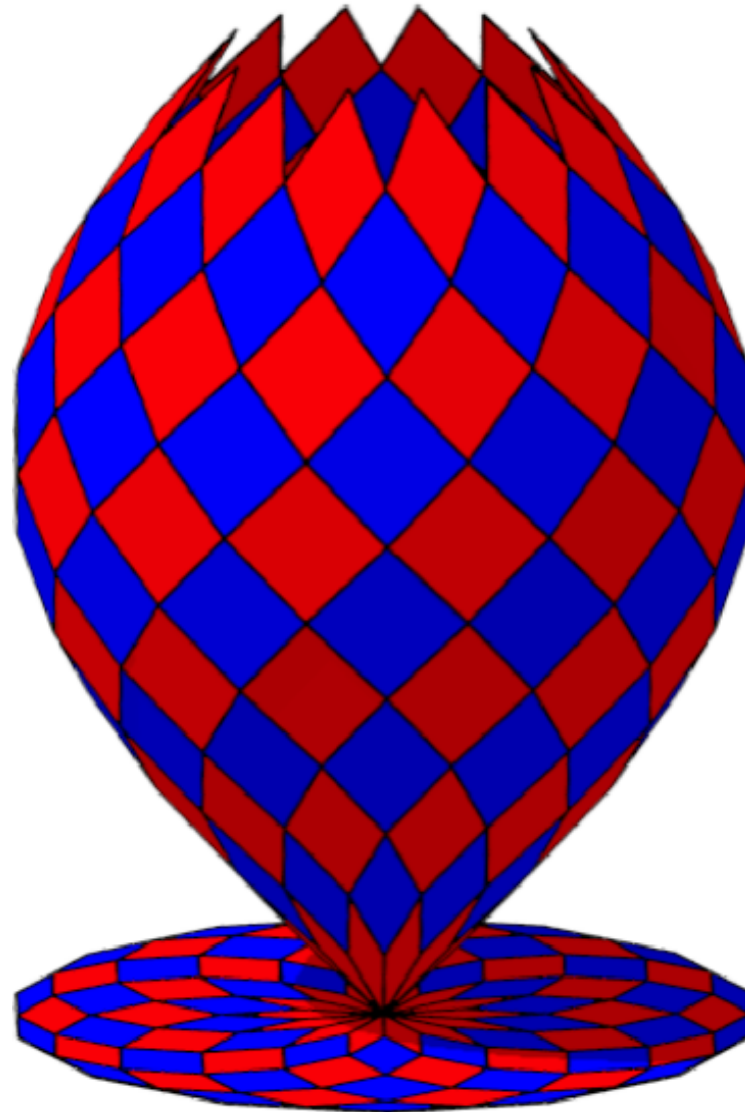
Rhomben gleicher Seitenlänge



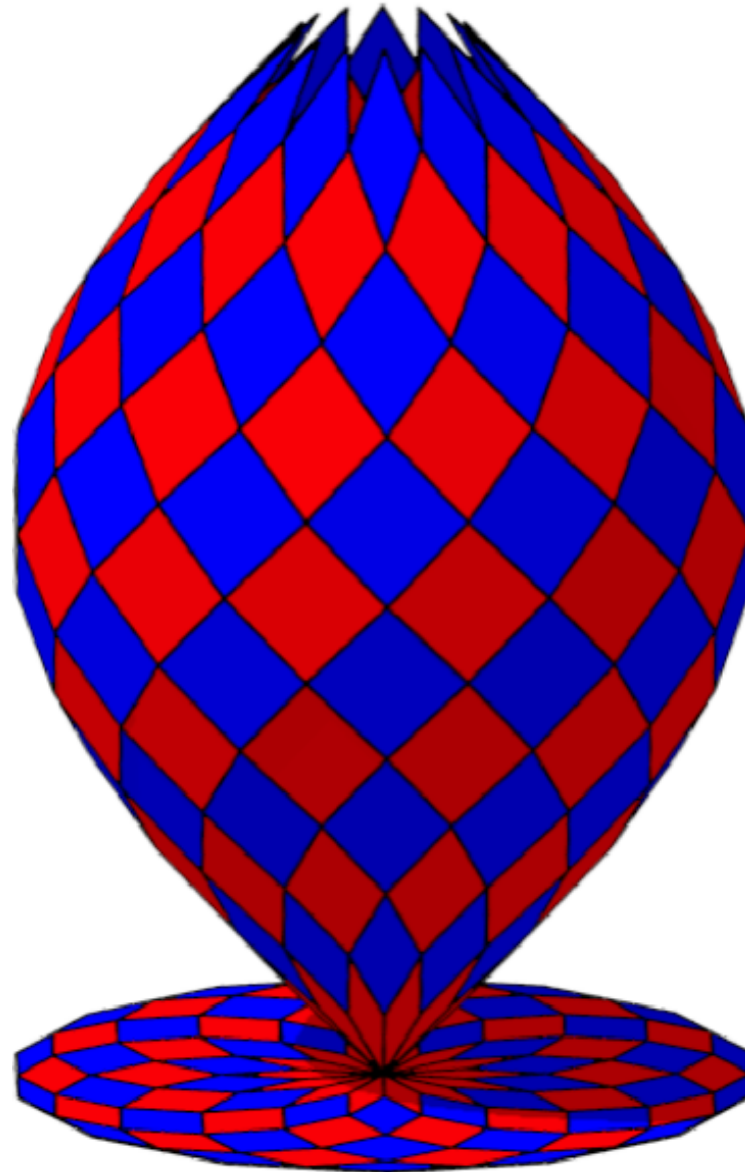
Rhomben gleicher Seitenlänge



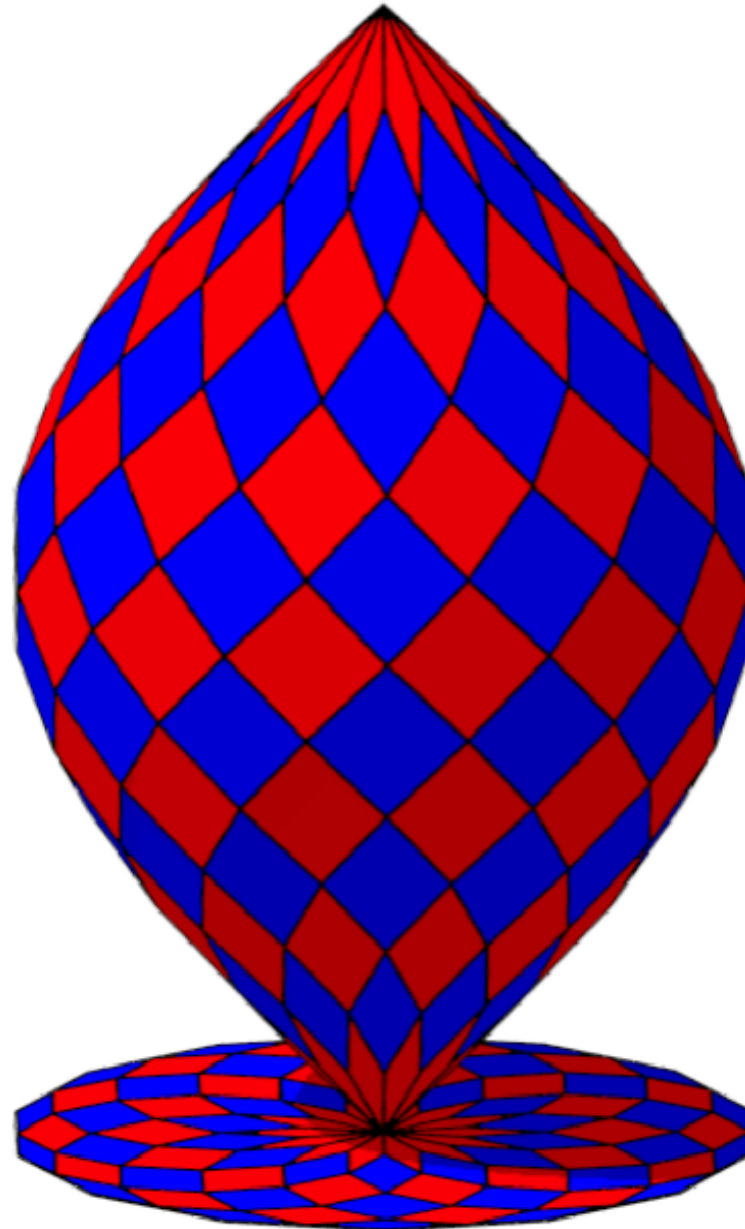
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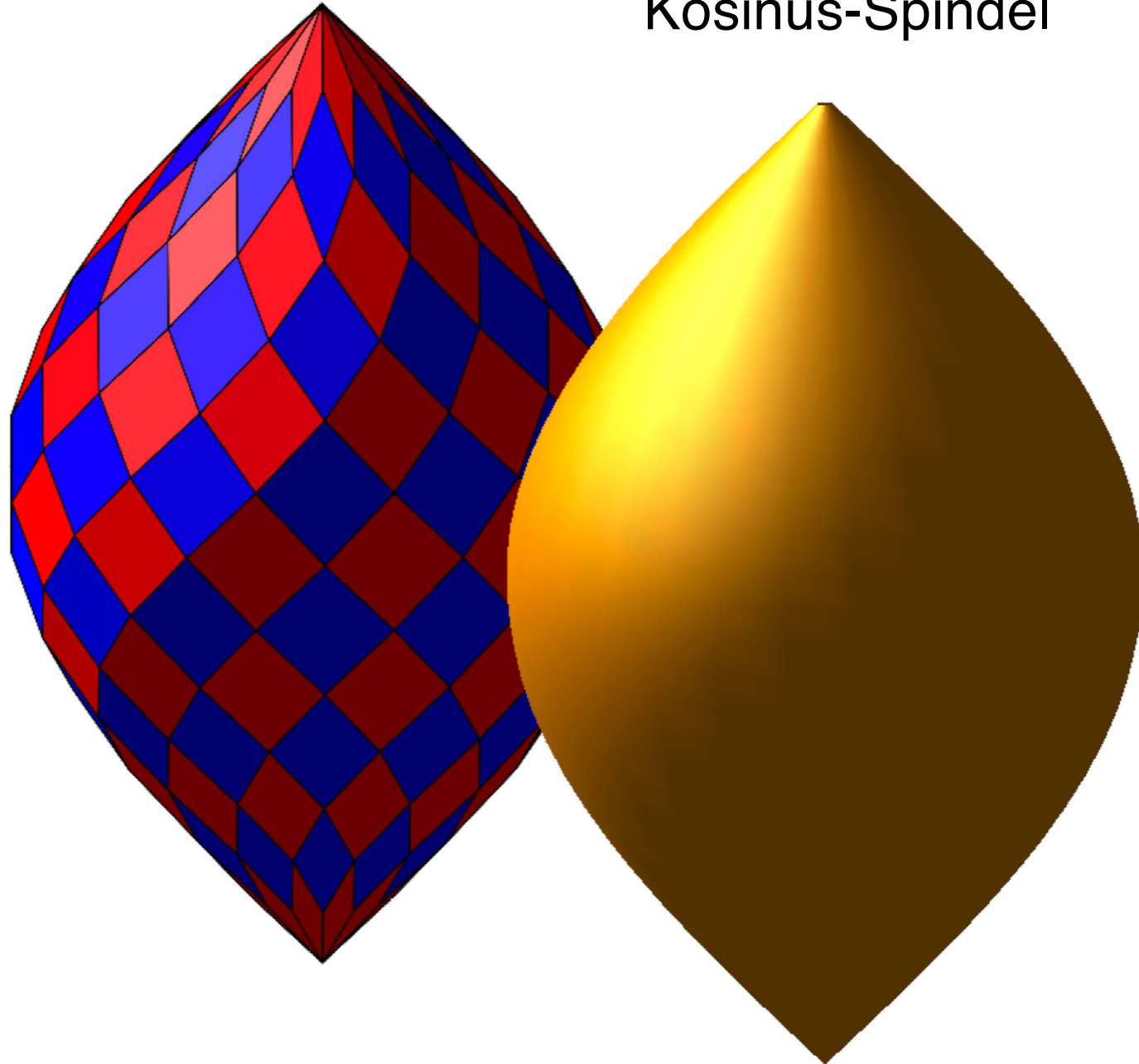
Rhomben gleicher Seitenlänge



Rhomben gleicher Seitenlänge

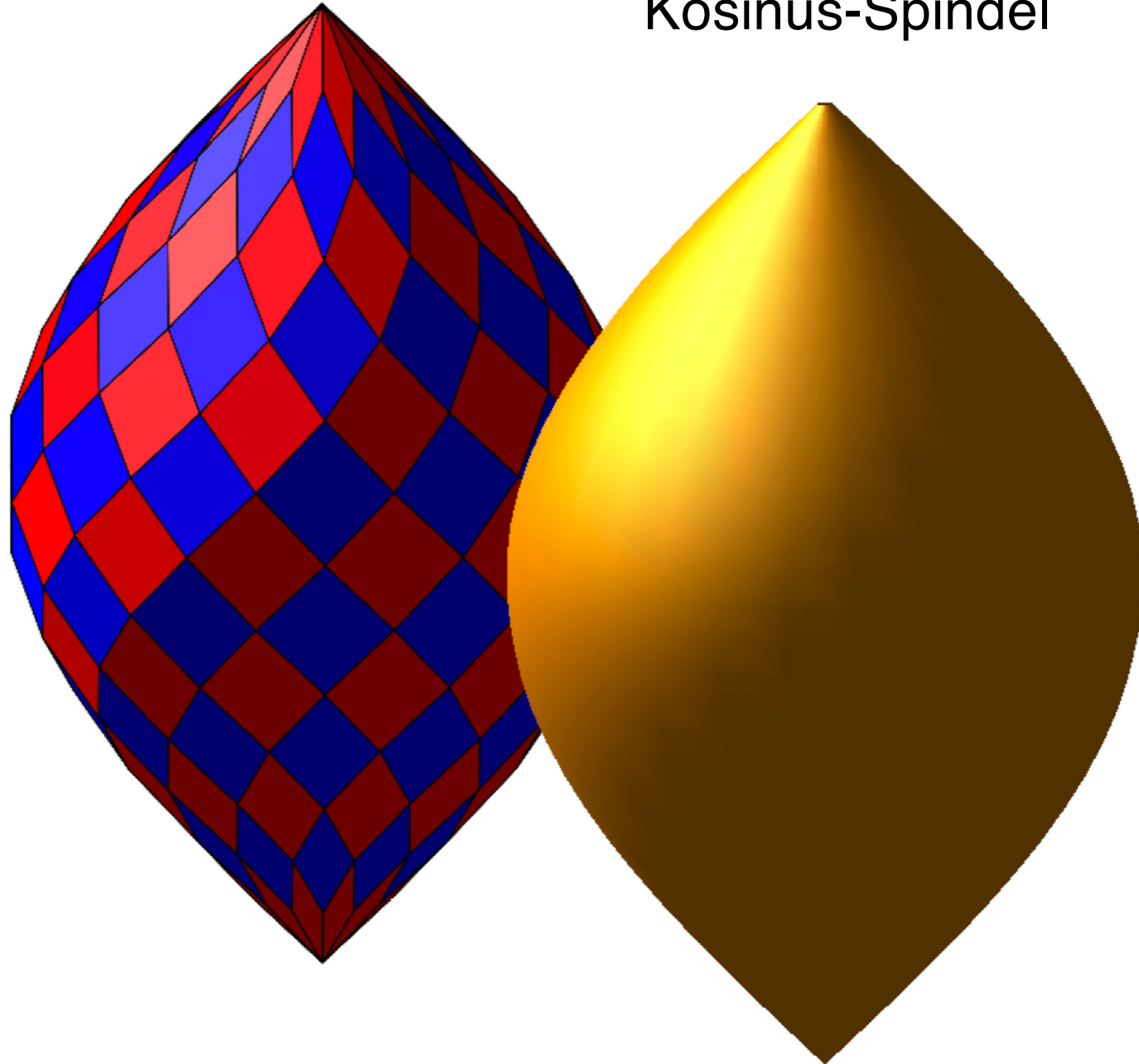


Kosinus-Spindel



Modell mit Schraubenlinie

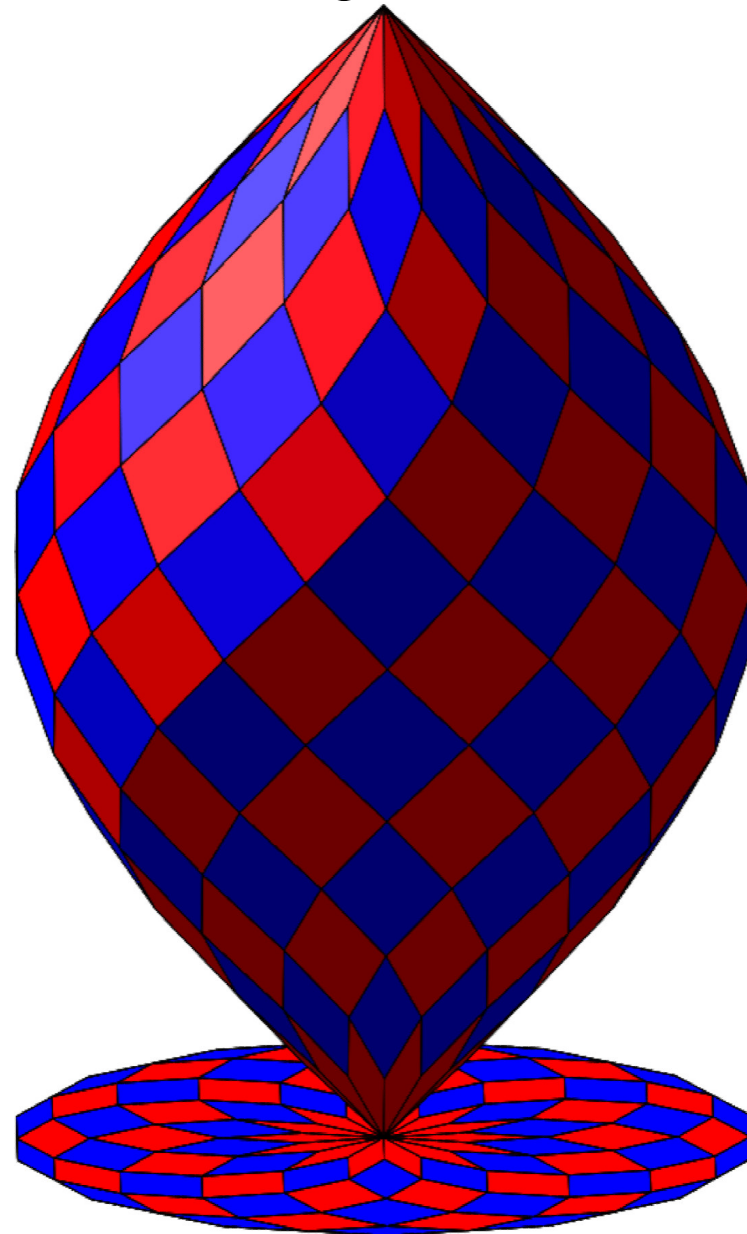
Kosinus-Spindel



Volumen der Kosinus-Spindel?

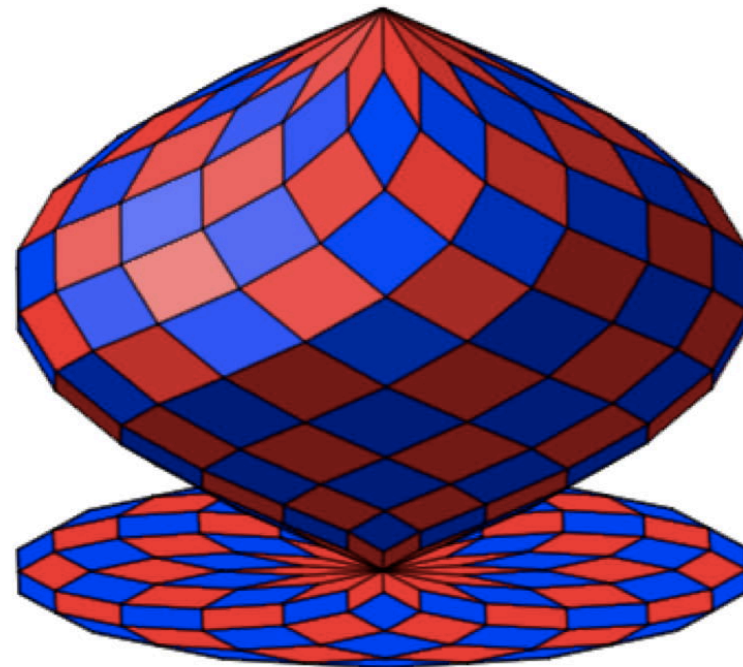
Rhomben gleicher Seitenlänge

Kantensteigung 1

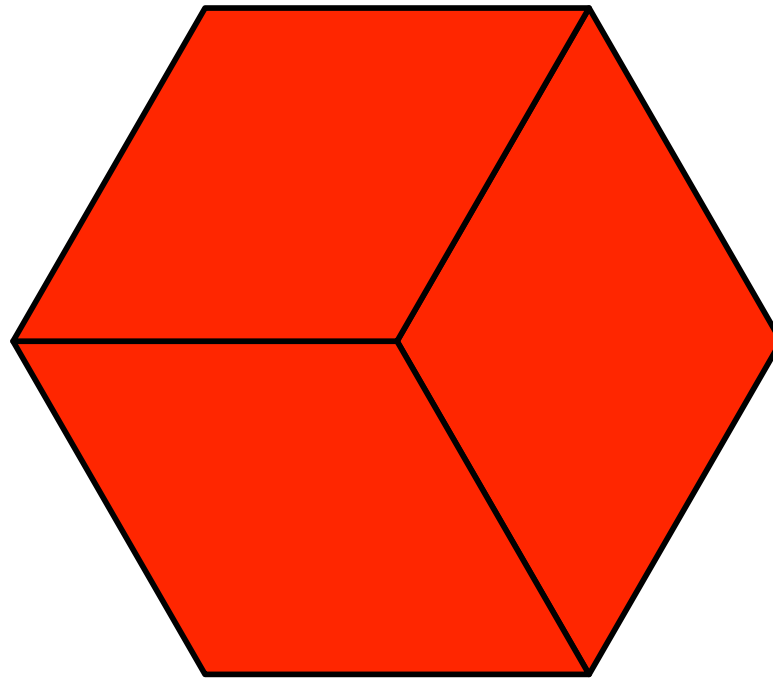


Rhomben gleicher Seitenlänge

Kantensteigung $\frac{1}{2}$ (Stauchung in z-Richtung)



Minimaler Rhomben“stern“



Minimaler Rhomben“stern“



Minimaler Rhomben“stern“

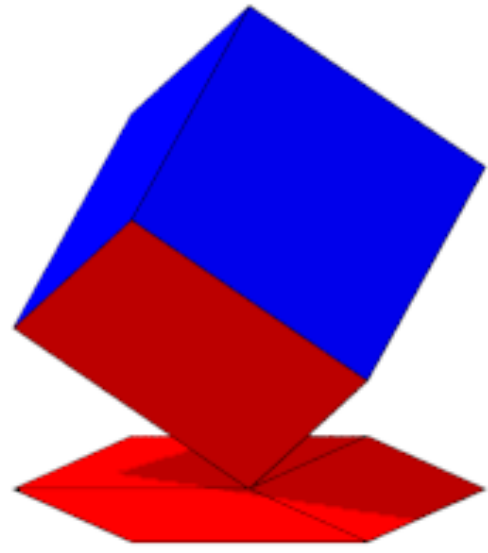
Kantensteigung = $\sqrt{\frac{1}{2}}$



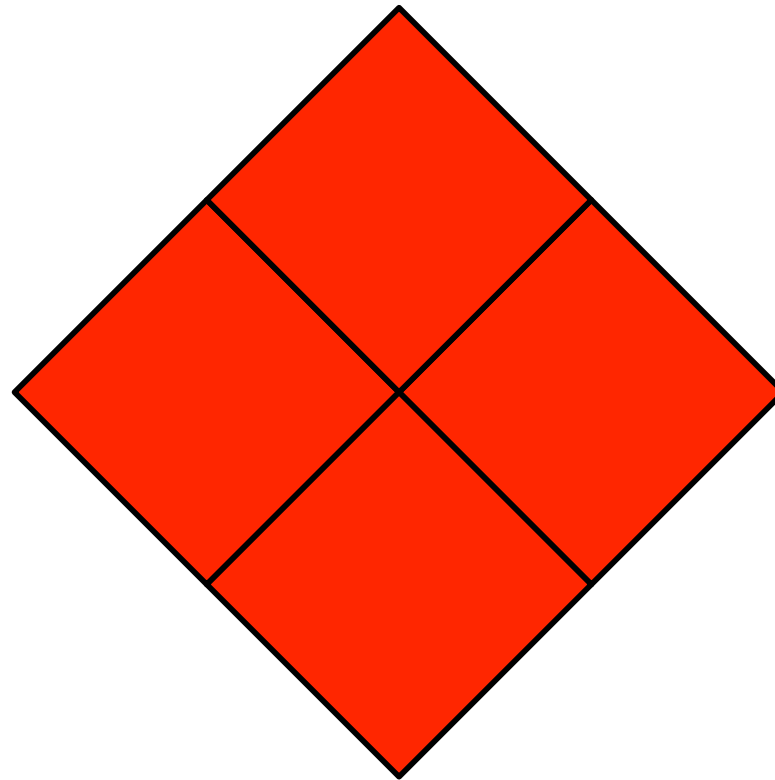
Minimaler Rhomben“stern“

Kantensteigung = $\sqrt{\frac{1}{2}}$

Würfel



Vier Rhomben im Zentrum



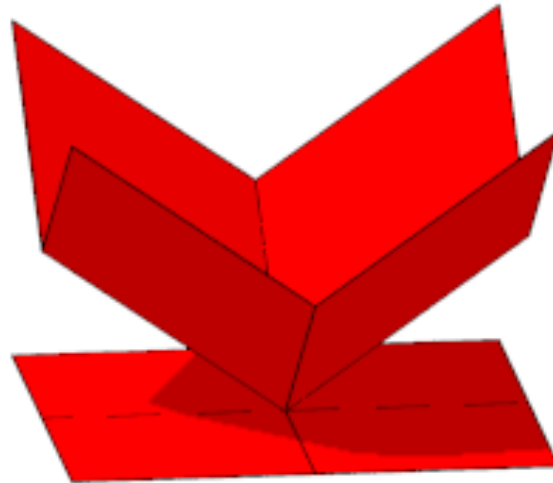
Vier Rhomben im Zentrum

Kantensteigung $\sqrt{\frac{1}{2}}$



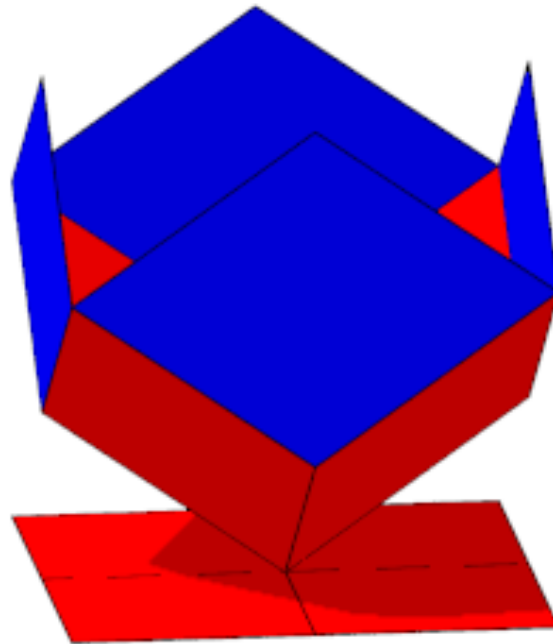
Vier Rhomben im Zentrum

Kantensteigung $\sqrt{\frac{1}{2}}$



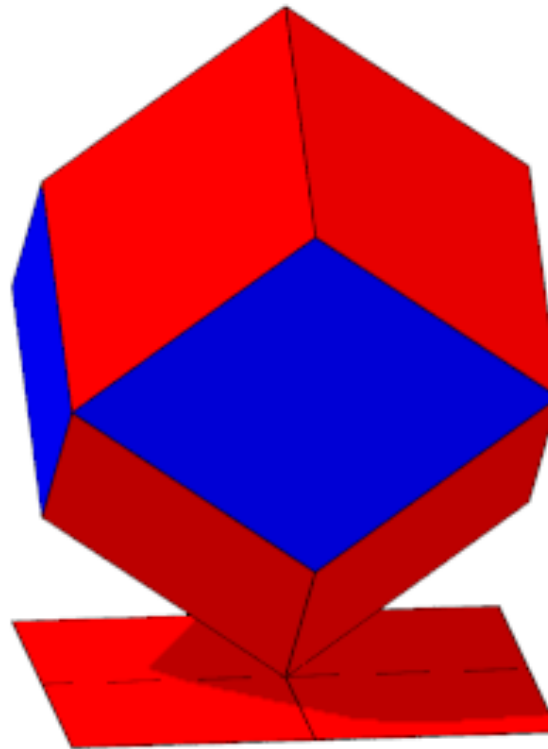
Vier Rhomben im Zentrum

Kantensteigung $\sqrt{\frac{1}{2}}$



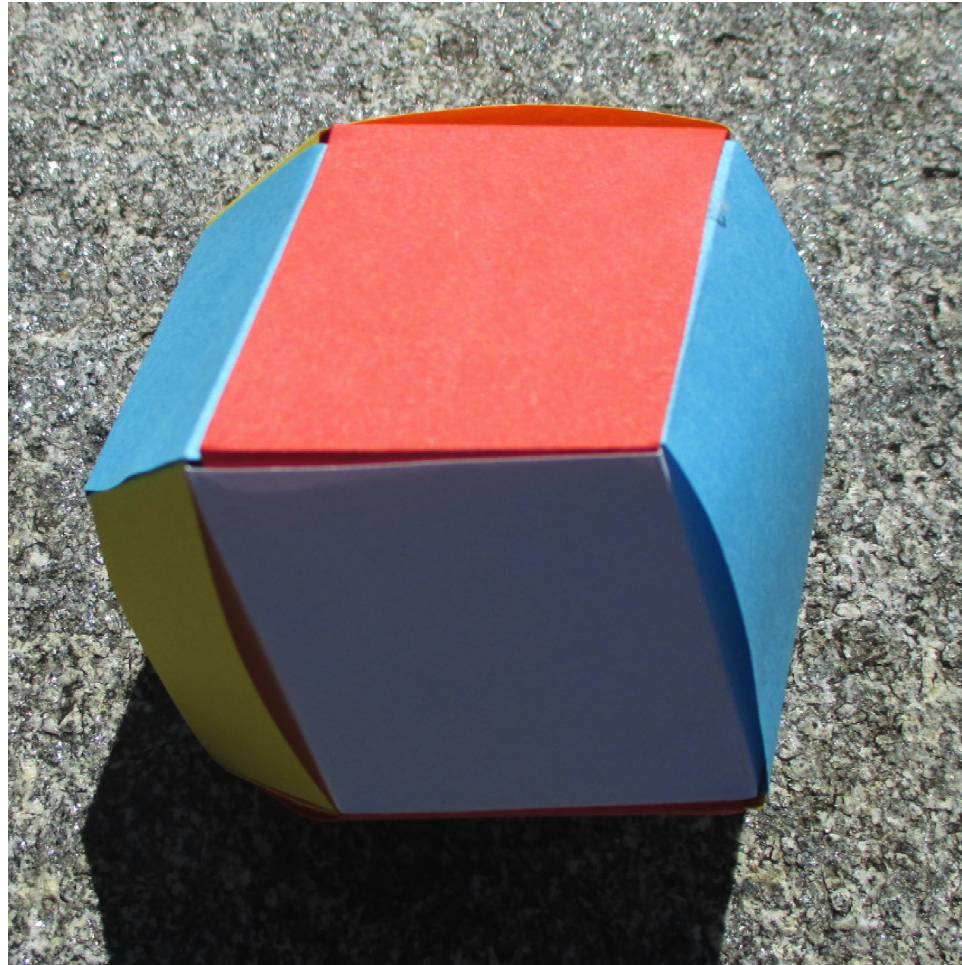
Vier Rhomben im Zentrum

Rhombendodekaeder



Papiermodell

Danke



www.walser-h-m.ch/hans/Vortraege/20220407