

The background features several mathematical elements: a green integral formula $\int_a^b f(x) dx$ on the left; a partial derivative $\frac{\partial}{\partial y} f(x, y, z)$ at the top center; a vector diagram with \vec{a} and \vec{b} at the top right; a hyperbolic identity $\cosh^2 \phi - \sinh^2 \phi = 1$ on the right; a volume formula $V_A = \frac{4}{3} \pi r^3$ on the right; a complex number formula $= |z| \cos \varphi + |z/i| \sin \varphi$ at the bottom right; and a black triangle on the bottom left.

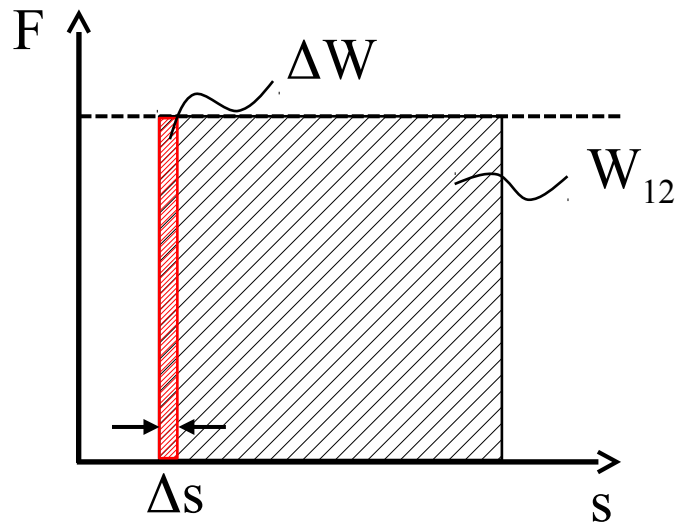
Mathematischer Vorkurs zu den Vorlesungen Physik A+B

Dr. Hans-Günter Ludwig
Wintersemester 2019/20

Kapitel 3:
Integralrechnung

Kraft-Weg-Diagramme

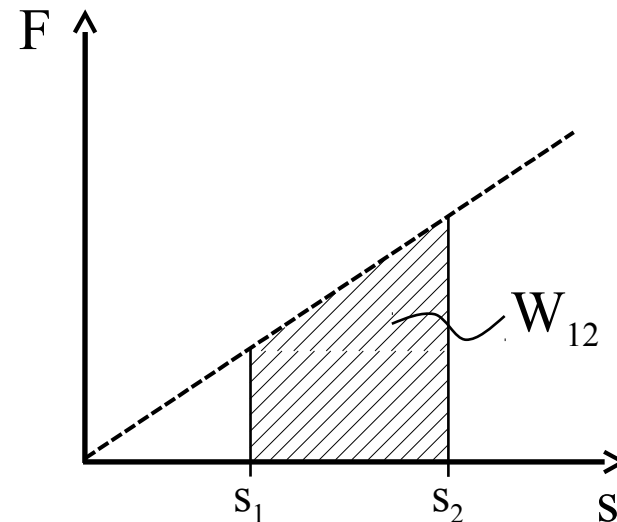
- Ortsunabhängige Kräfte:



$$\Delta W = F \cdot \Delta s$$

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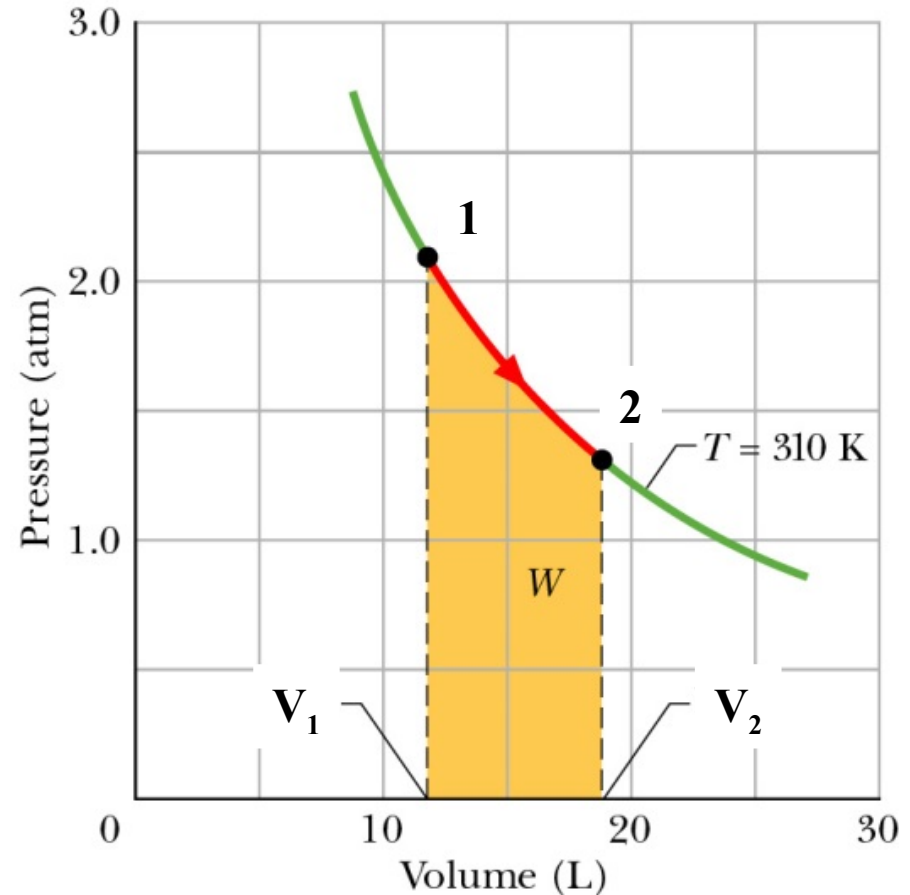
$$dW = F ds$$

$$W_{12} = \int_{s_1}^{s_2} F ds$$

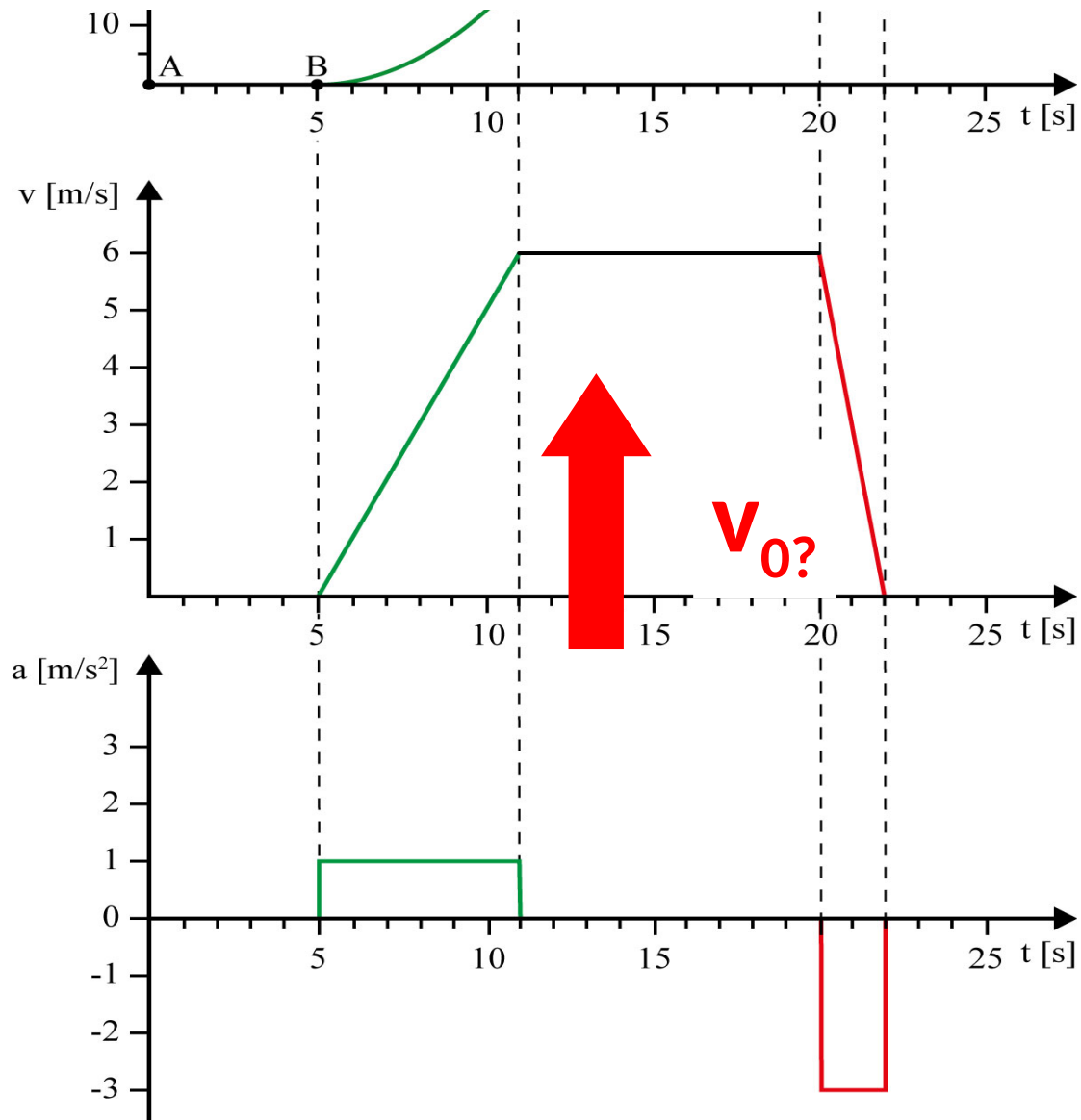
Zustandsänderungen und Arbeit

$$W_{12} = \int dW = \int_{V_1}^{V_2} p dV$$

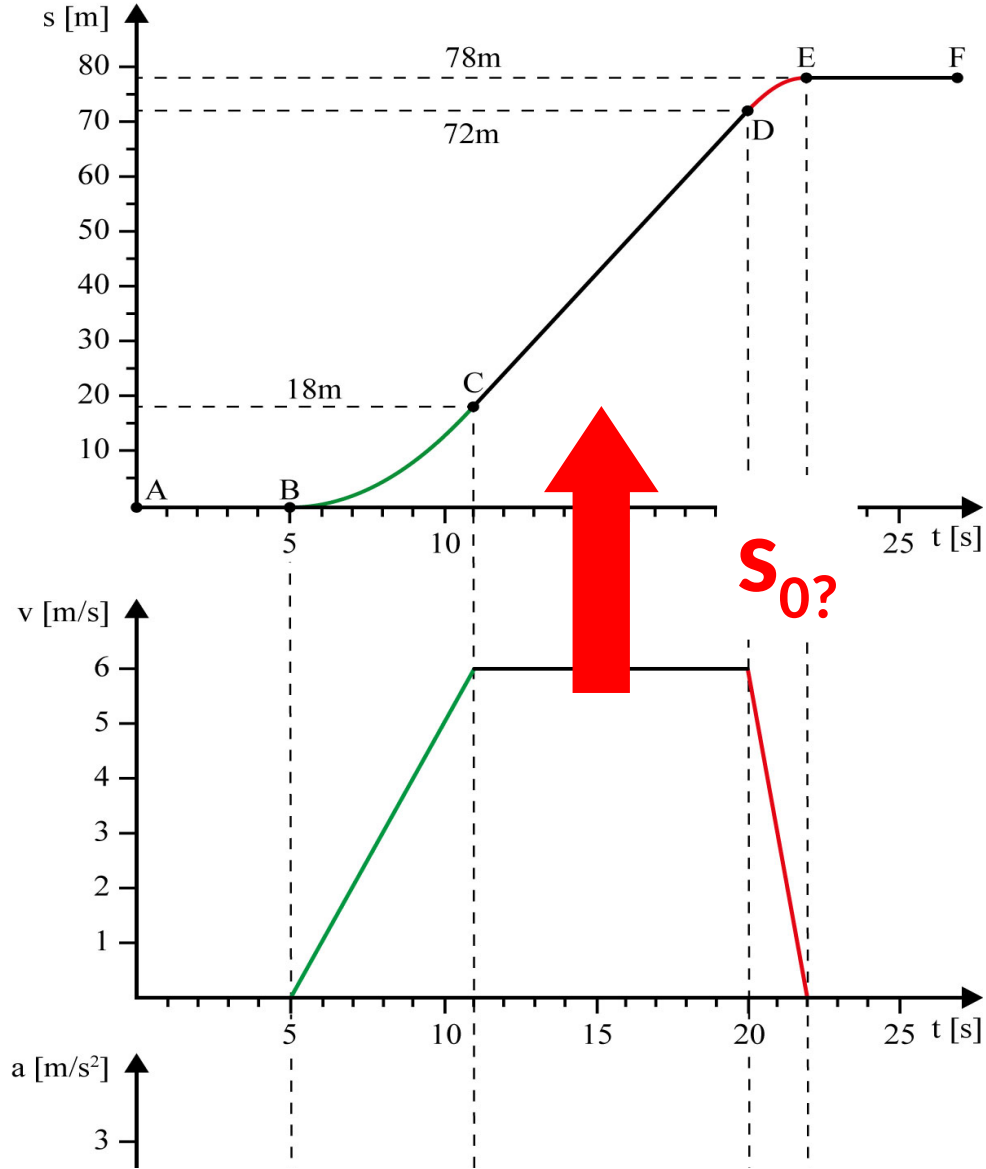
- D.h. die Arbeit W_{12} entspricht der Fläche unter der Kurve der Zustandsänderung im p,V-Diagramm.



Beschleunigungs-Zeit-Diagramm

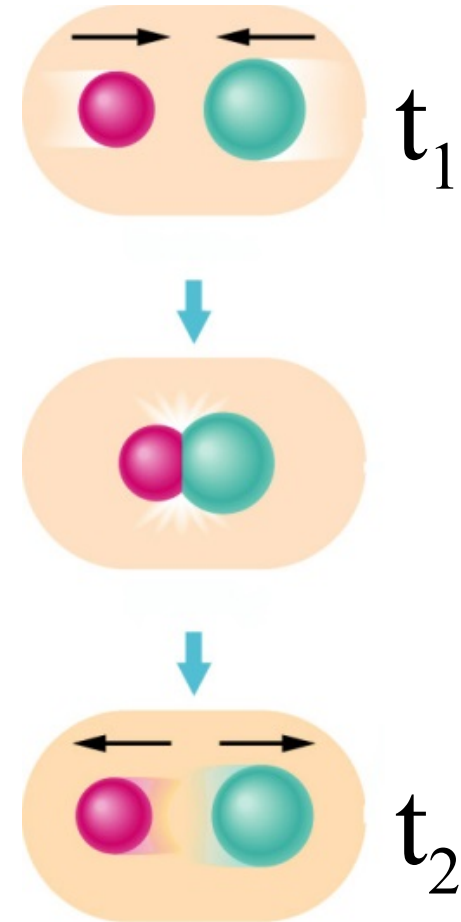
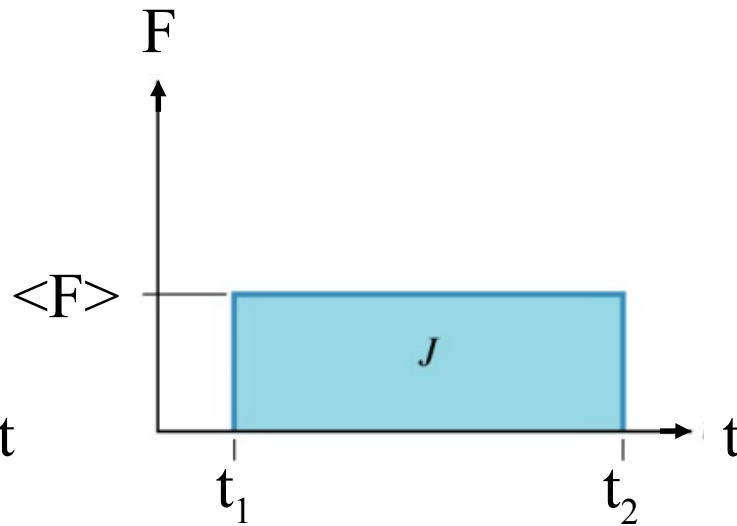
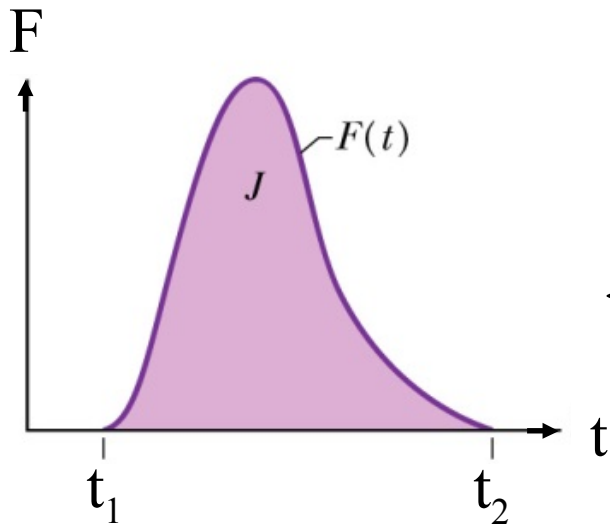


Geschwindigkeits-Zeit-Diagramm

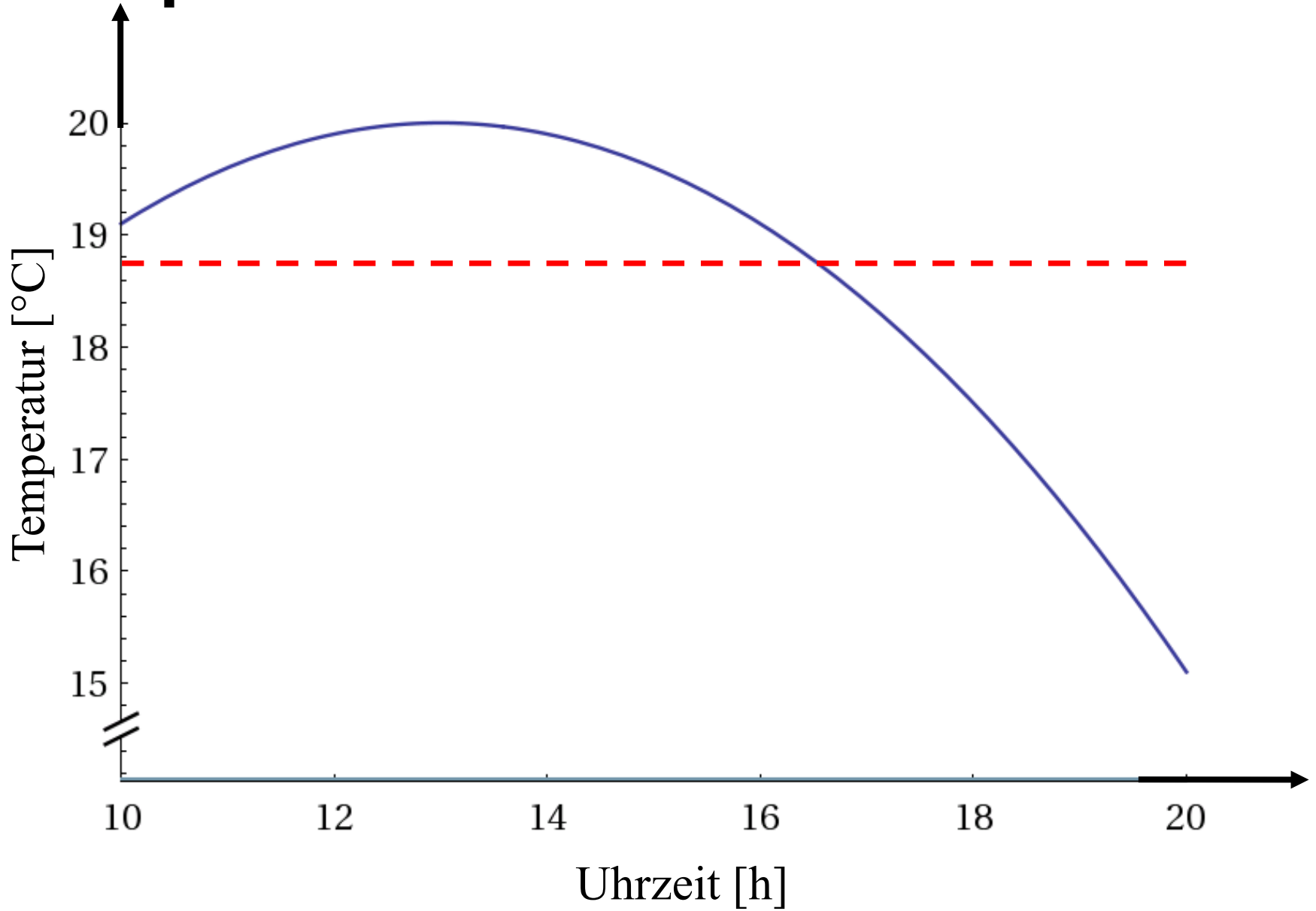


Kraftstoß

$$\Delta \vec{p} = \vec{J} := \int_{t_1}^{t_2} \vec{F}(t) dt = \langle \vec{F} \rangle \Delta t$$



Temperatur-Mittelwert



A brown bear is shown resting on a large, grey, textured rock. The bear's head is resting on the left side of the rock, and its body extends towards the right. The bear's fur is thick and brown. A semi-transparent dark grey rectangular box is overlaid on the bear's midsection, containing the text "15 Minuten Pause!" in white, bold, sans-serif font.

15 Minuten Pause!