Leichtbau

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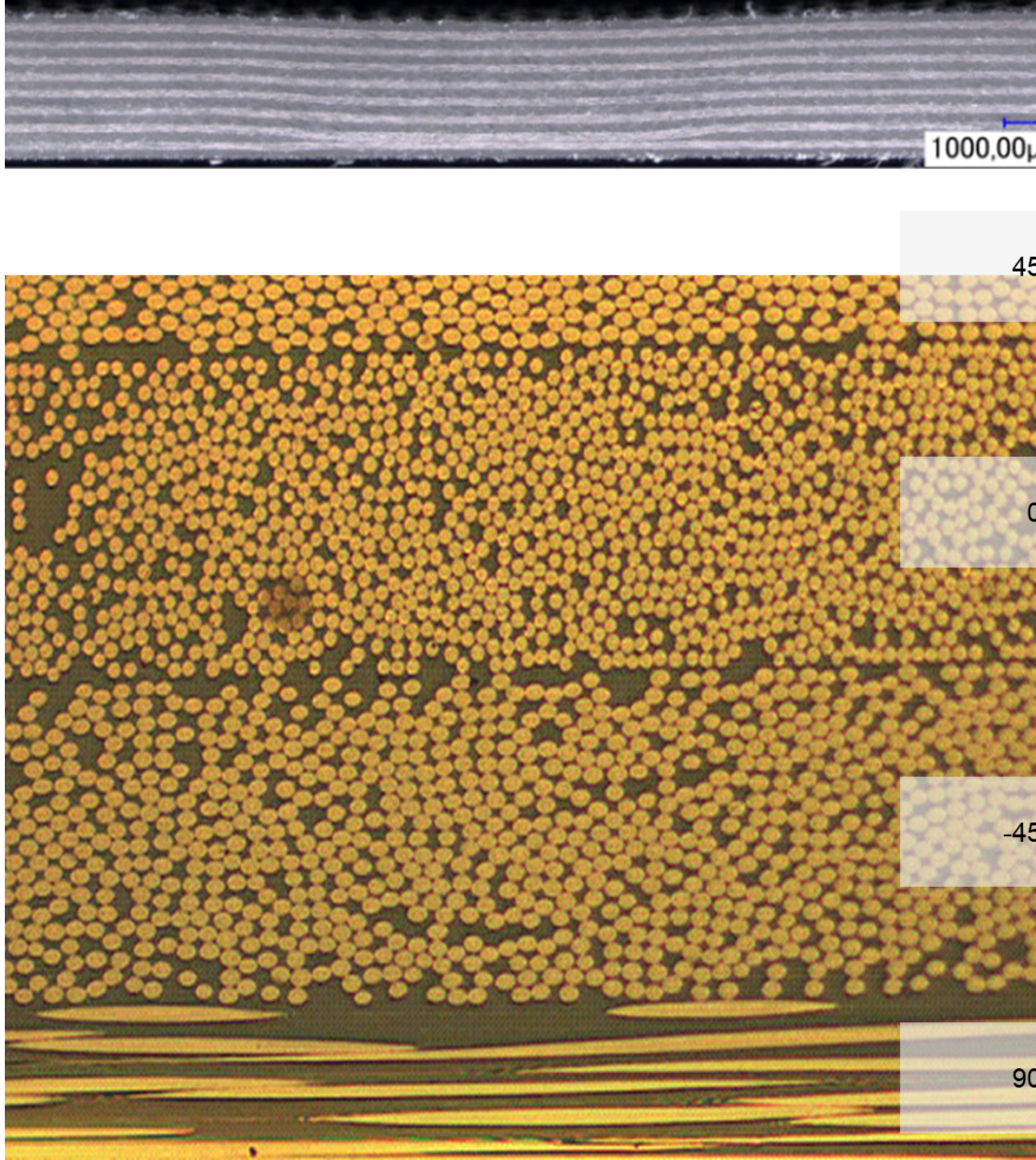

$$\rightarrow: F_1 \cos\alpha + F_2 + F_3 \cos\beta = 0$$

$$\uparrow: F_1 \sin\alpha - F_e - F_3 \sin\beta = 0$$

$$\sigma_i = \frac{F_i}{A_i} = E_i \varepsilon = E_i \frac{\delta u_i}{l_i}$$
$$F_i = E_i A_i \frac{\delta u_i}{l_i}$$

Energie

$$W_i = E_i A_i \frac{\delta u_i}{l_i} \delta u_i$$

$$F_e \delta u_y = F_1 \delta u_1 + F_2 \delta u_2 + F_3 \delta u_3$$
$$\delta u_y = \sin\alpha \delta u_1 = \sin\beta \delta u_3$$

$$F_e \delta u_y = F_1 \frac{\delta u_y}{\sin\alpha} + F_2 \delta u_2 + F_3 \frac{\delta u_y}{\sin\beta}$$

aus $\rightarrow$

$$E_2 A_2 \frac{\delta u_x}{l_2} = E_1 A_1 \frac{\delta u_1}{l_1} \cos\alpha + E_3 A_3 \frac{\delta u_3}{l_3} \cos\beta$$

$$E_2 A_2 \frac{\delta u_x}{l_2} = E_1 A_1 \frac{1}{l_1} \cos\alpha \frac{\delta u_y}{\sin\alpha} + E_3 A_3 \frac{1}{l_3} \cos\beta \frac{\delta u_y}{\sin\beta}$$

$$\delta u_x^2 = \left[l_2 \frac{E_1 A_1 \frac{\cos\alpha}{l_1 \sin\alpha} + E_3 A_3 \frac{\cos\beta}{l_3 \sin\beta}}{E_2 A_2} \right]^2 \delta u_y^2 = A \delta u_y^2$$

$$F_e \delta u_y = \left(\frac{E_1 A_1}{l_1 \sin\alpha^2} + \frac{E_3 A_3}{l_3 \cos\beta^2} \right) \delta u_y^2 + \frac{E_2 A_2}{l_2} A \delta u_y^2$$

nach δu_y auflösen und dann den Rest bestimmen.