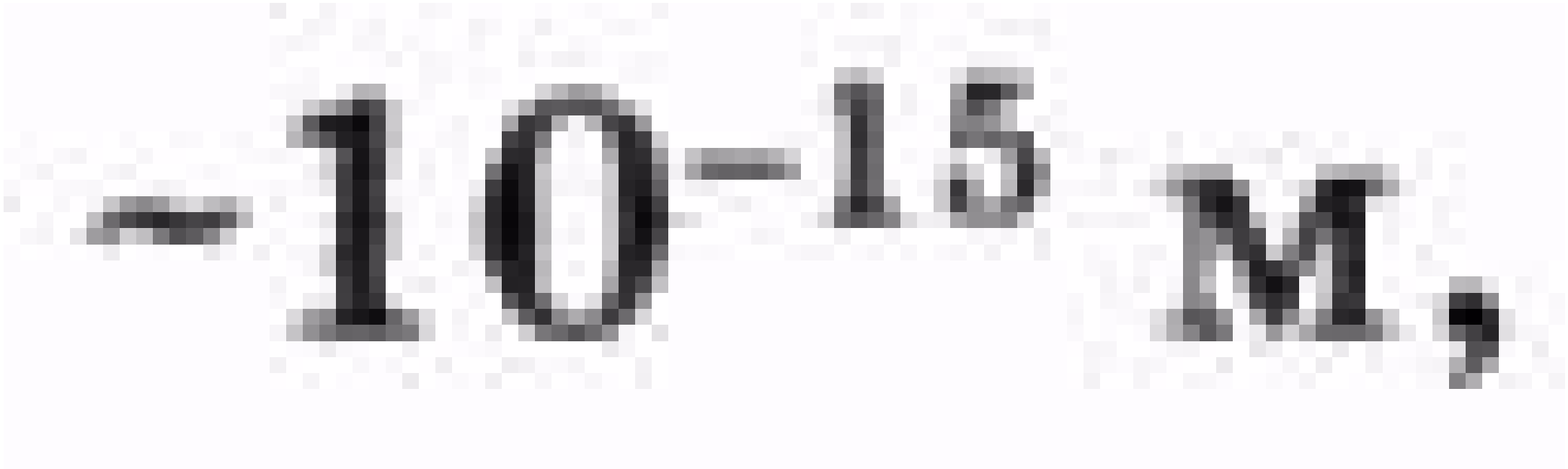
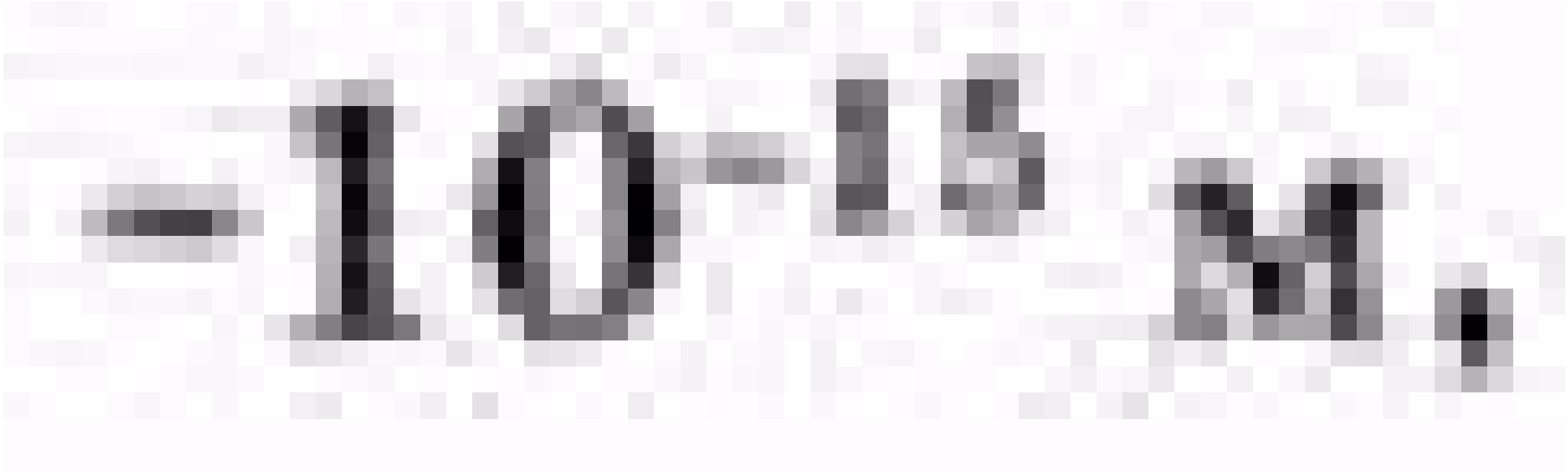
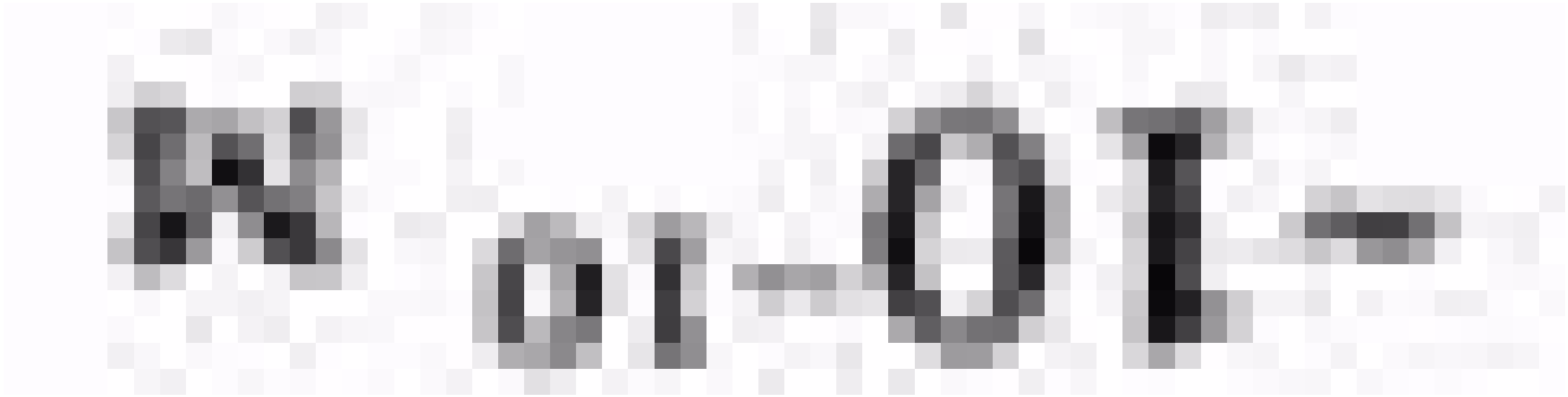
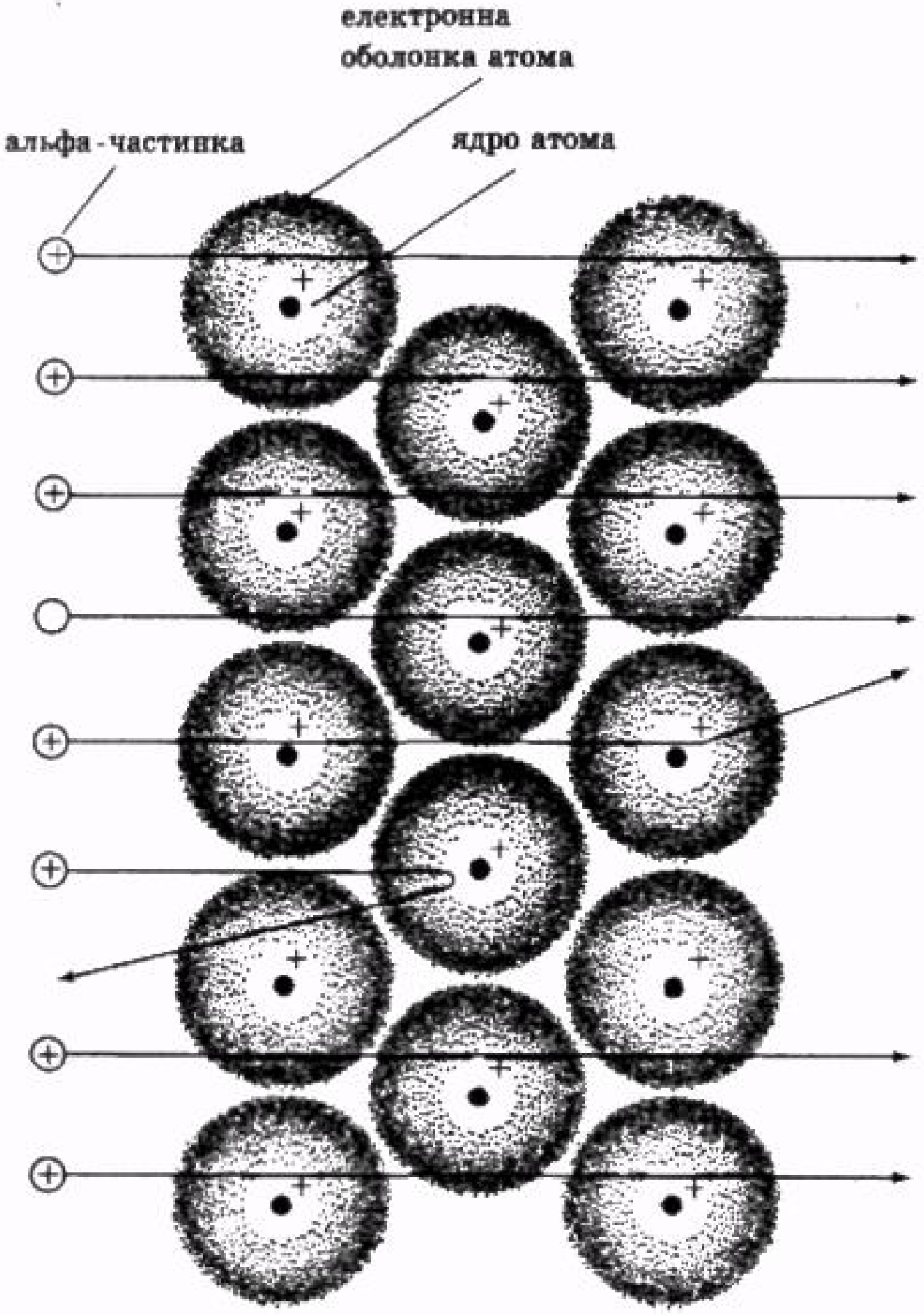
$$e = 1{,}6 \cdot 10^{-19}\ \text{Кл}$$

$$e = 1{,}6 \cdot 10^{-19}\ Кл$$

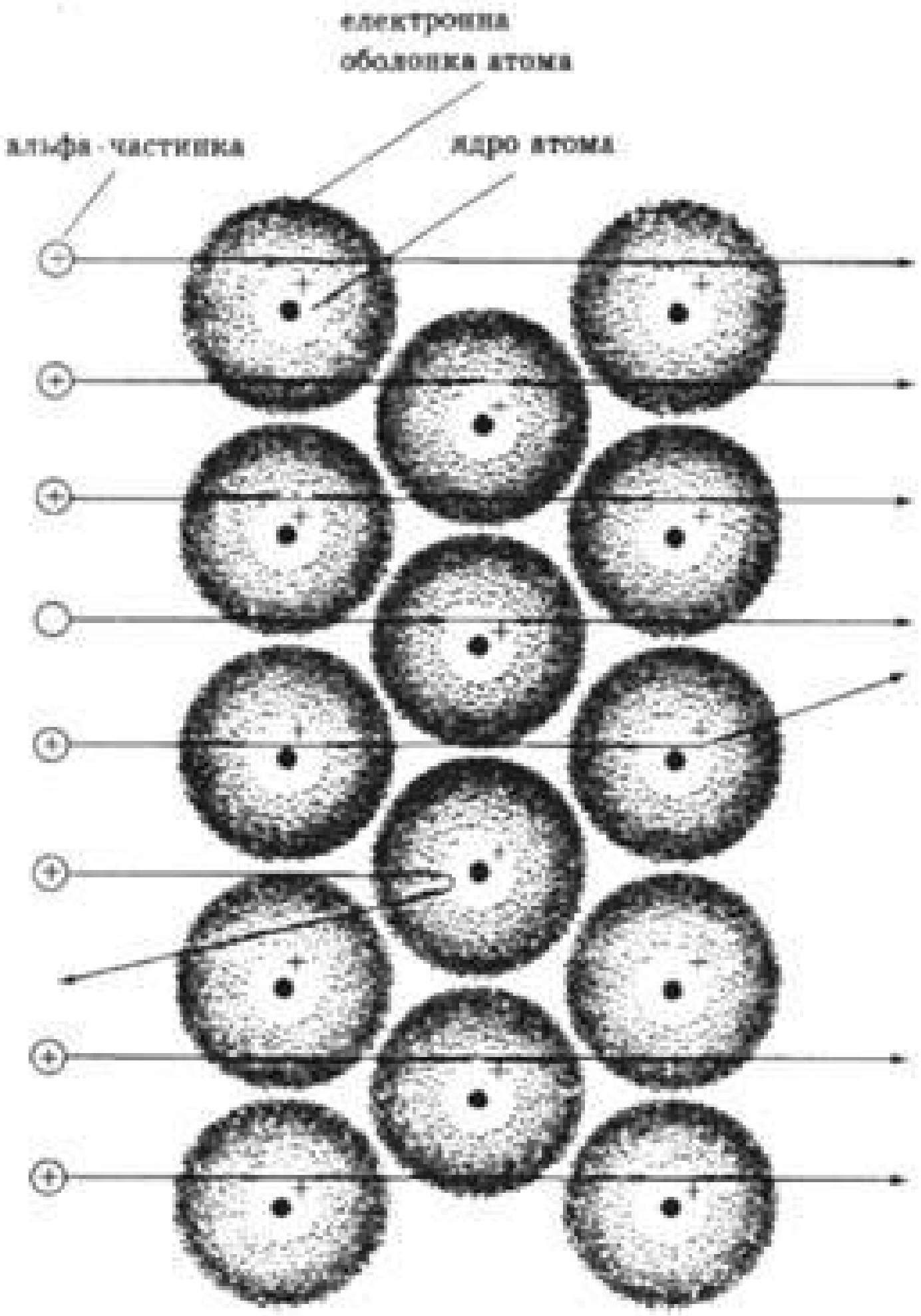




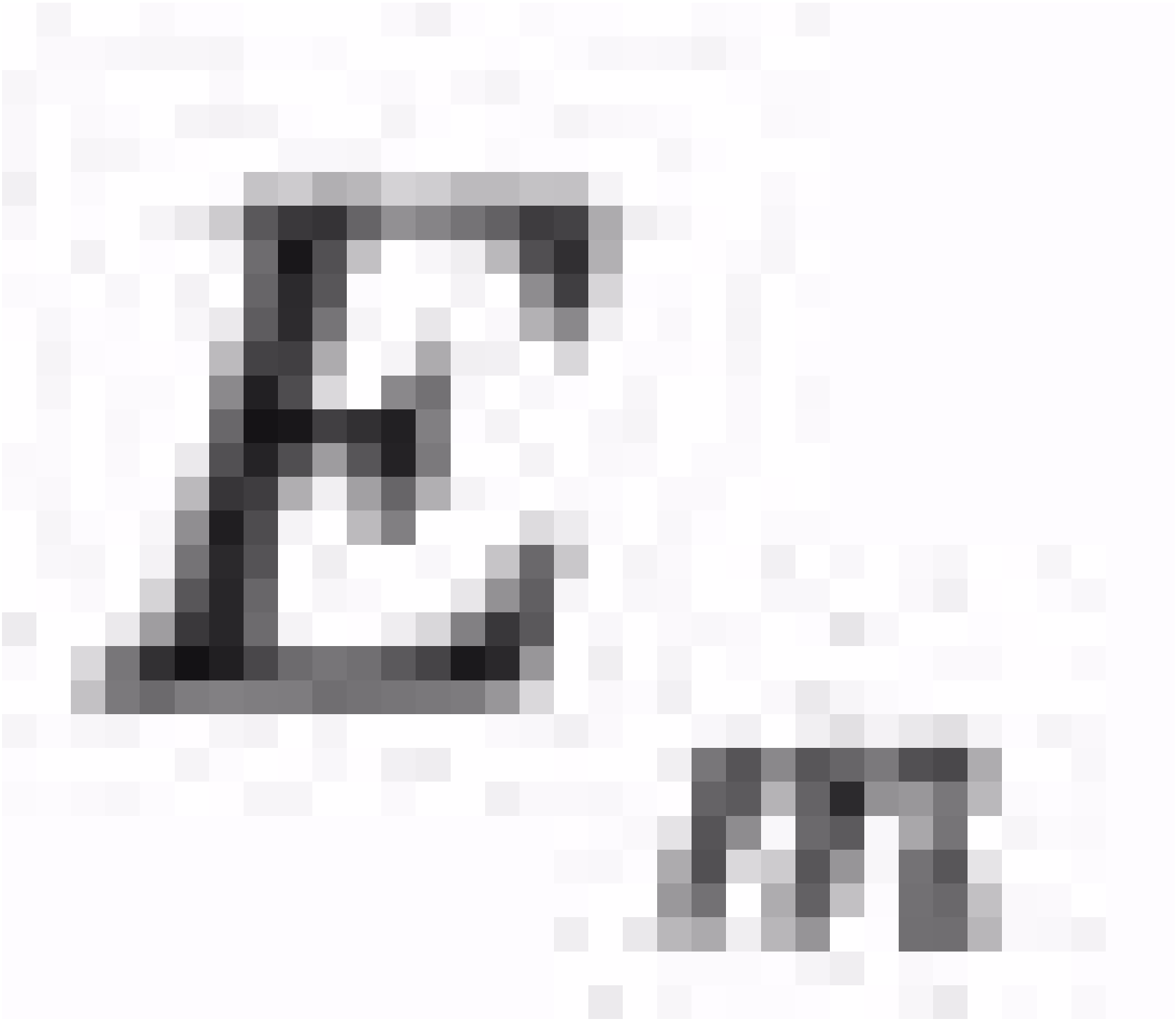


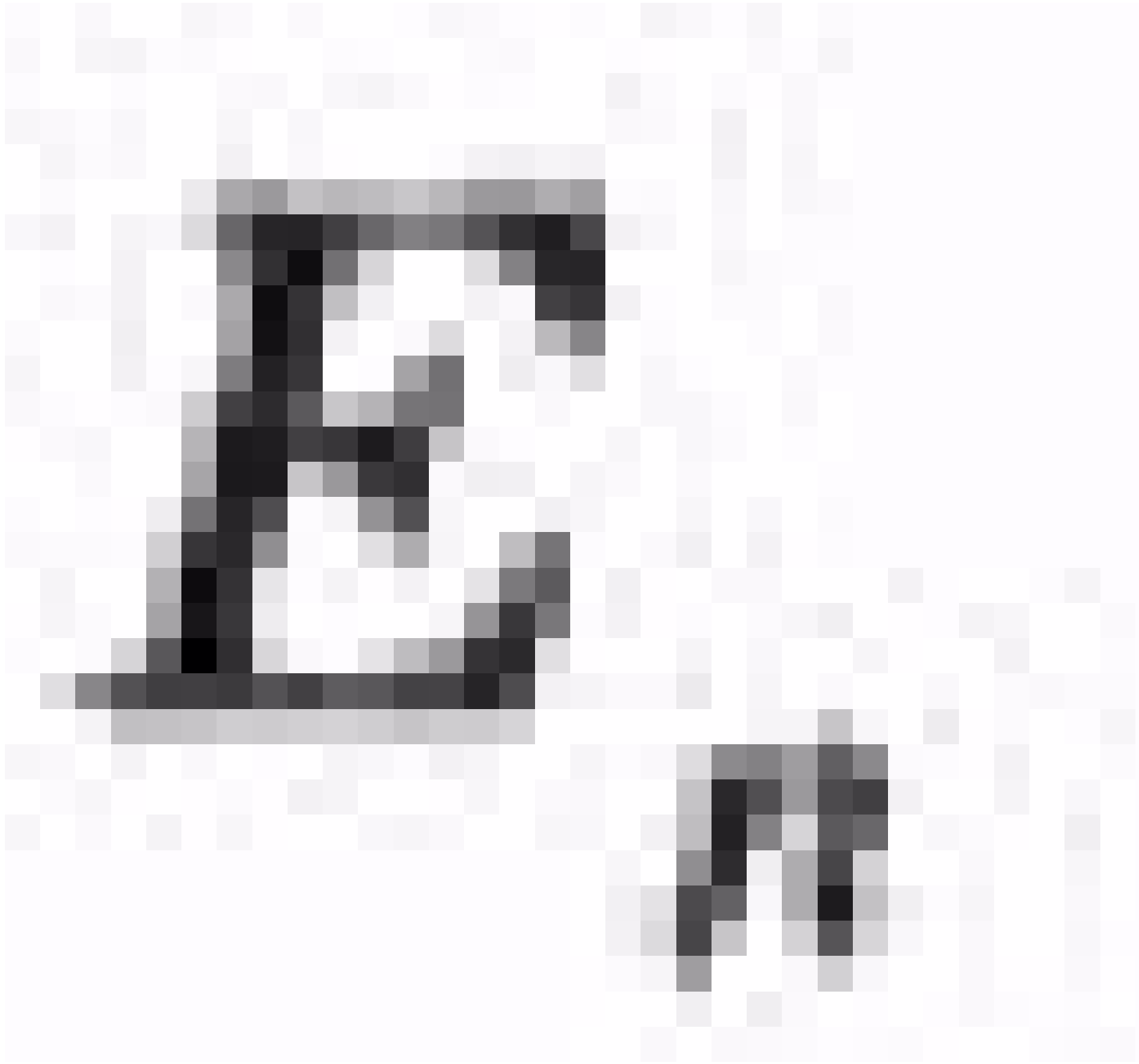


Мал. 2.216



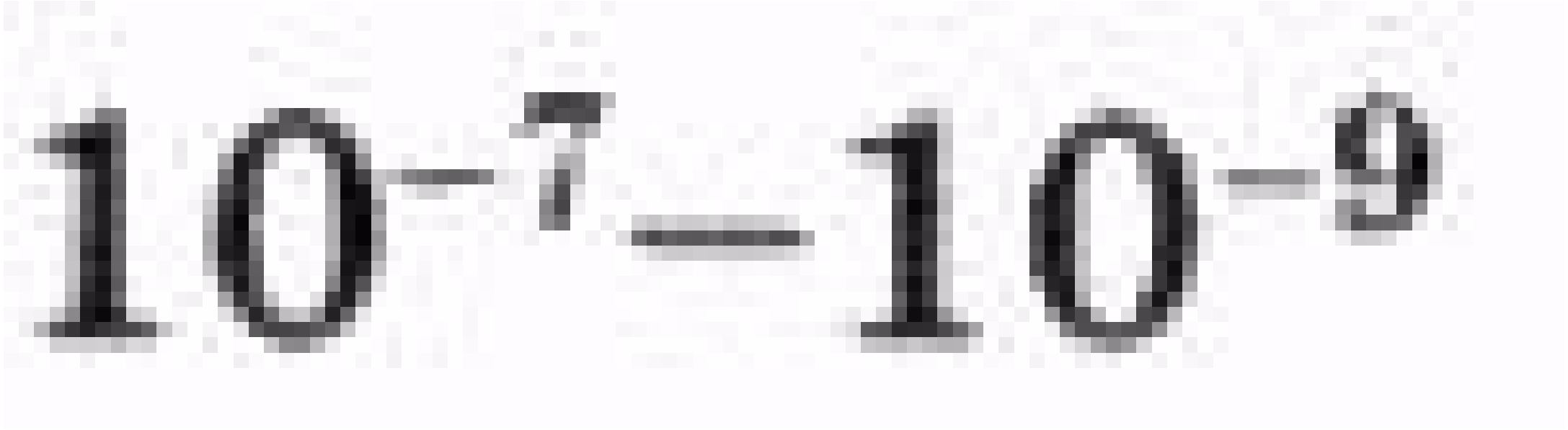
Мал. 2.216

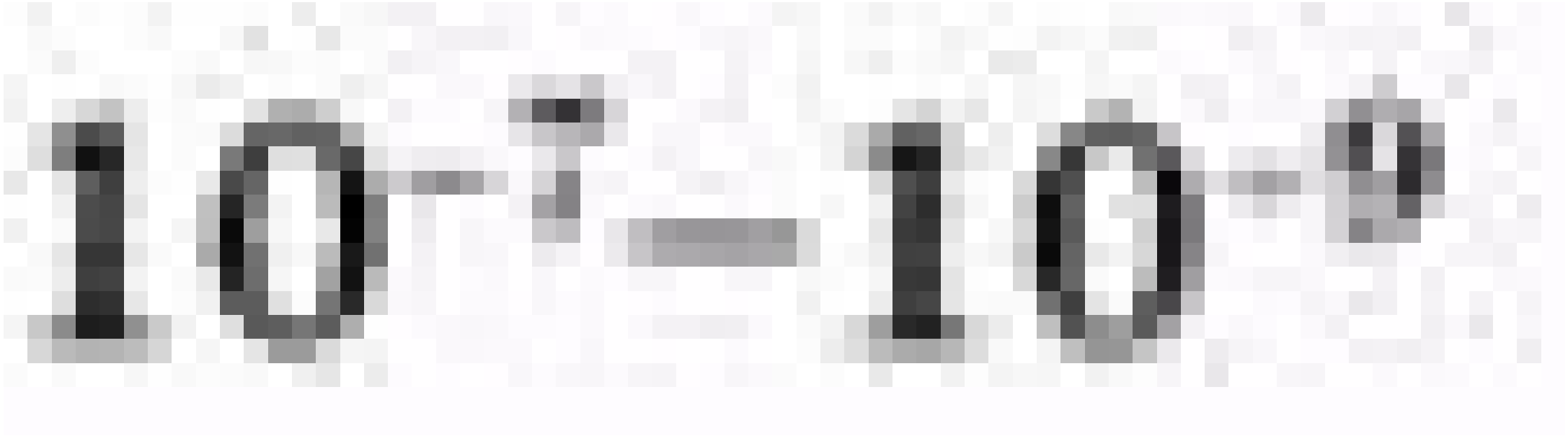


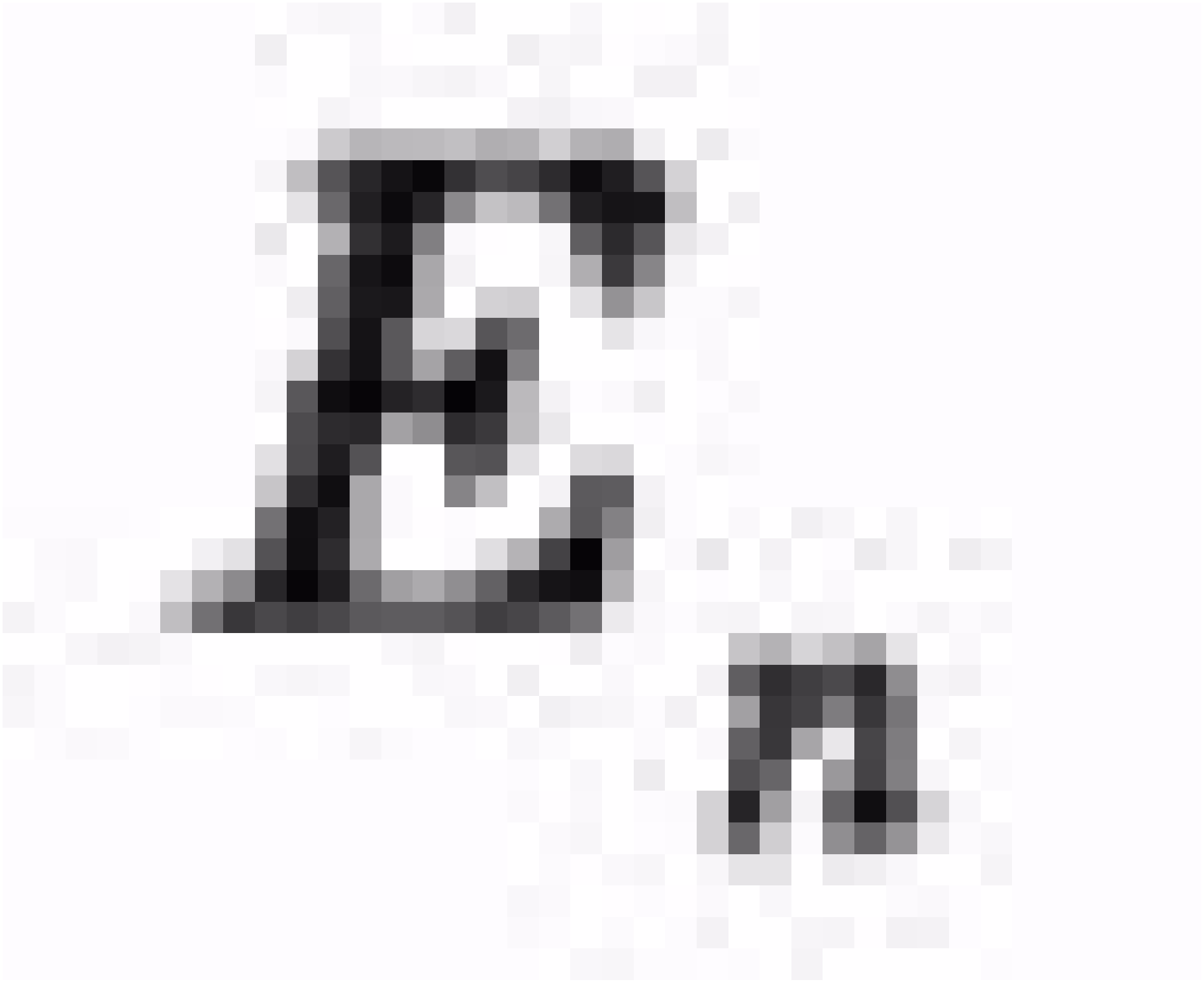


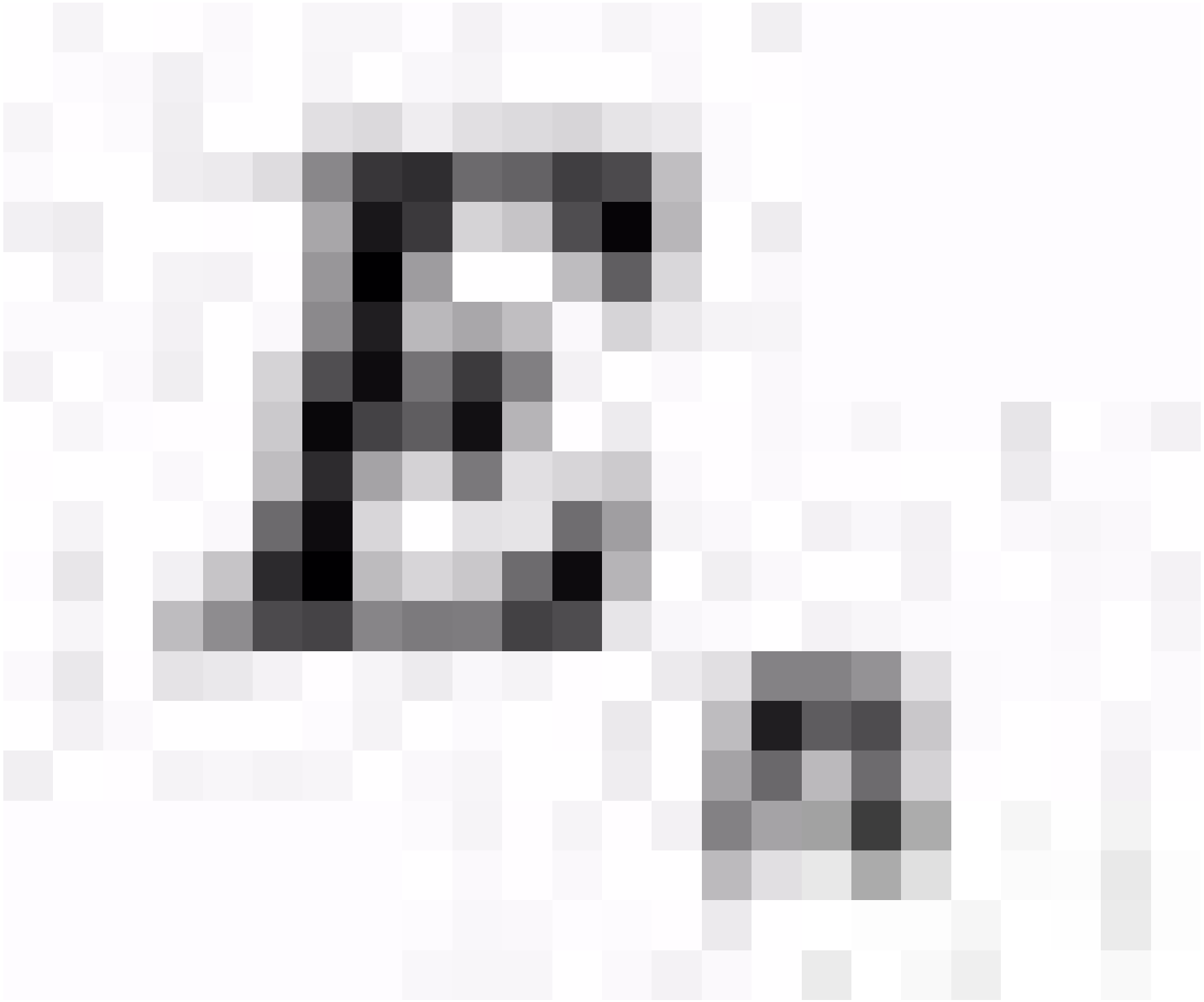
$$h\nu = E_m - E_n \qquad (59.1).$$

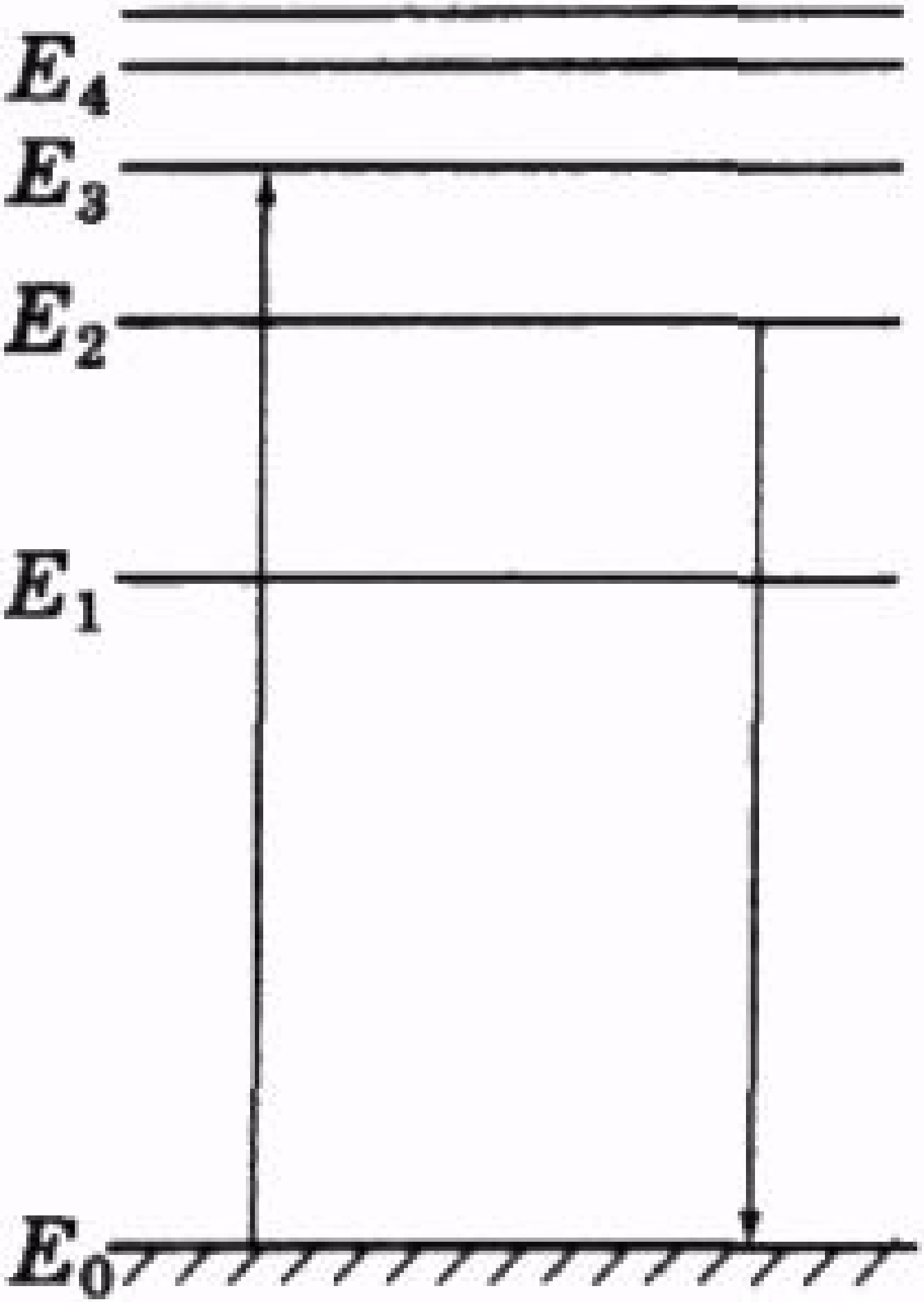
$$h\nu = E_m - E_n \qquad (59.1).$$


10−7 − 10−9

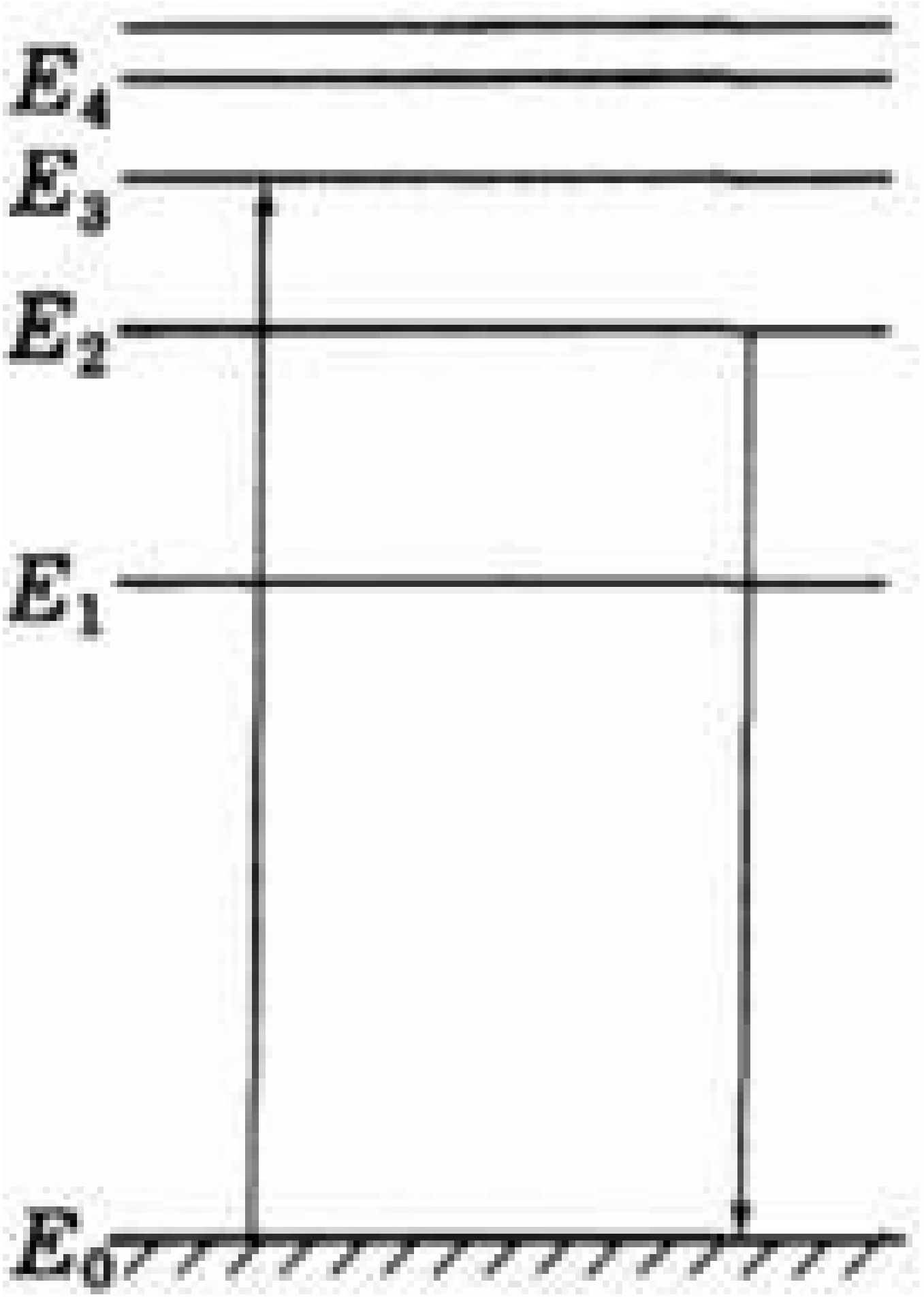








Мал. 2.217



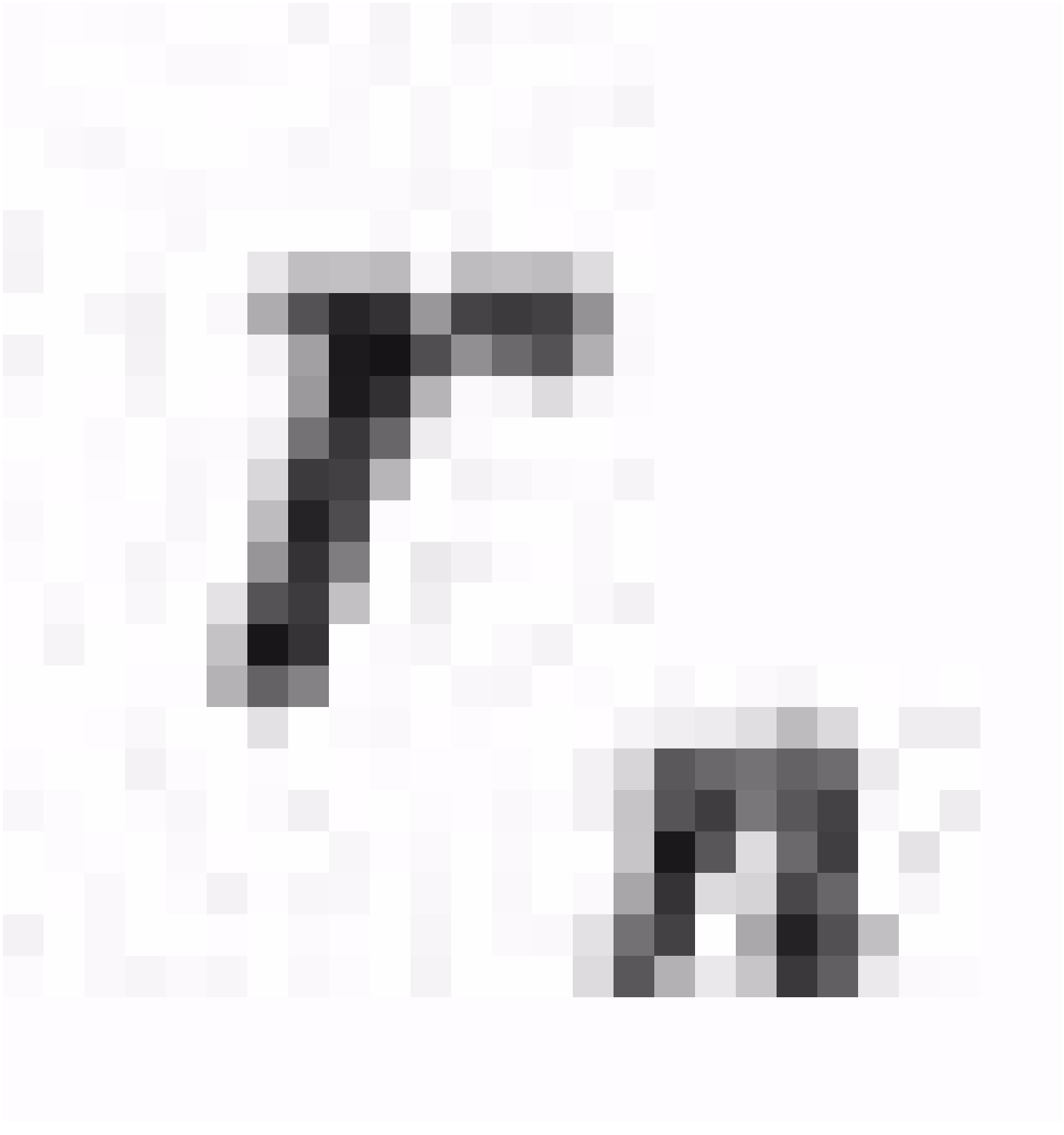
Мал. 2.217

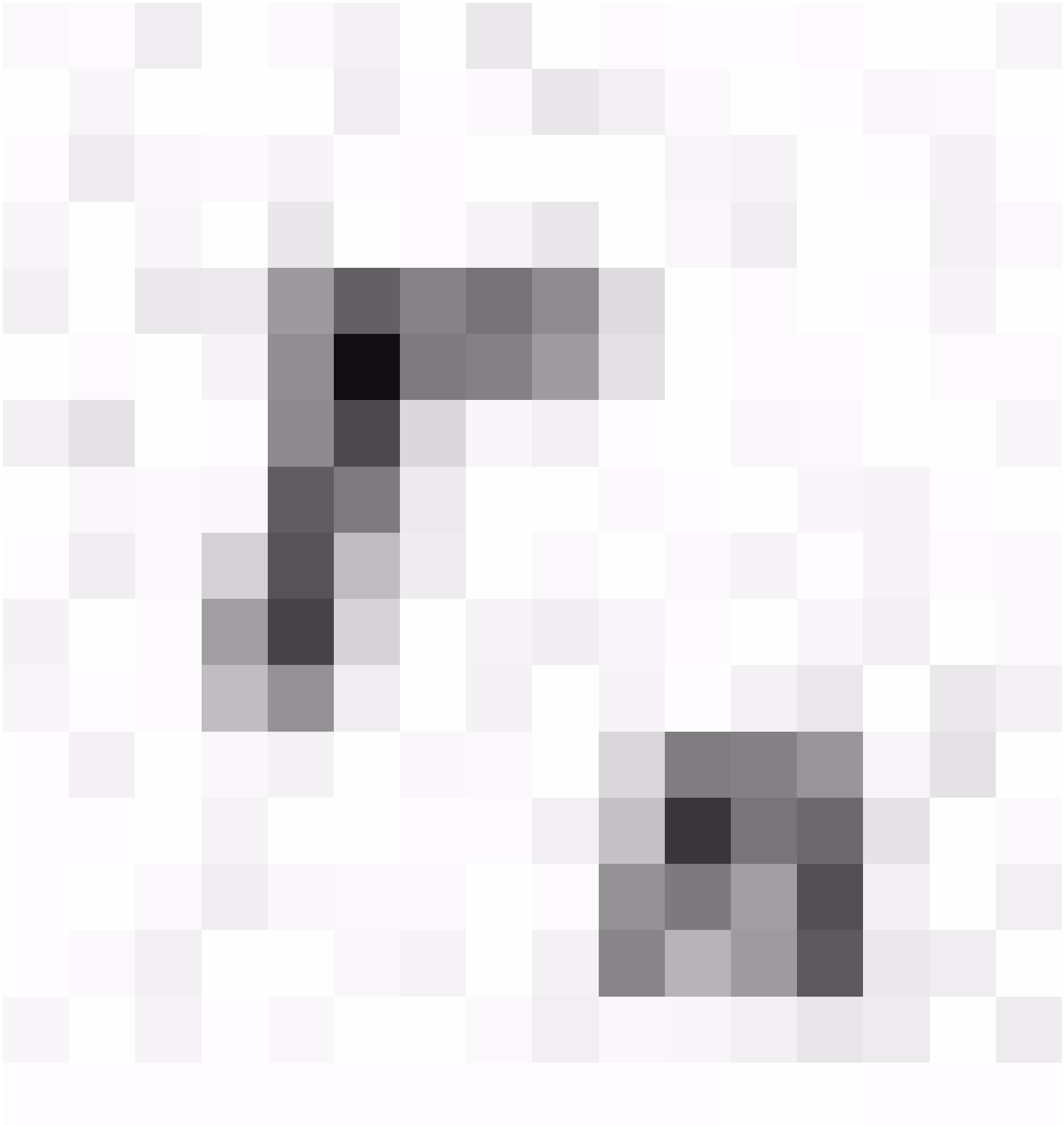
$$mvr = n\frac{h}{2\pi} \qquad (59.2),$$

$$mvr = n\frac{h}{2\pi} \qquad (59.2),$$

$$\frac{mv^2}{r} = \frac{eZe}{4\pi\varepsilon_0 r^2} \qquad (59.3).$$

$$\frac{mv^2}{r} = \frac{e\,Ze}{4\pi\varepsilon_0 r^2} \qquad (59.3).$$





$$r_n = \frac{n^2 h^2 \varepsilon_0}{\pi m Z e^2} \qquad (59.4).$$

$$r_n = \frac{n^2 h^2 \varepsilon_0}{\pi m Z e^2} \qquad (59.4).$$

$$\Delta E = A = q\Delta\varphi,$$

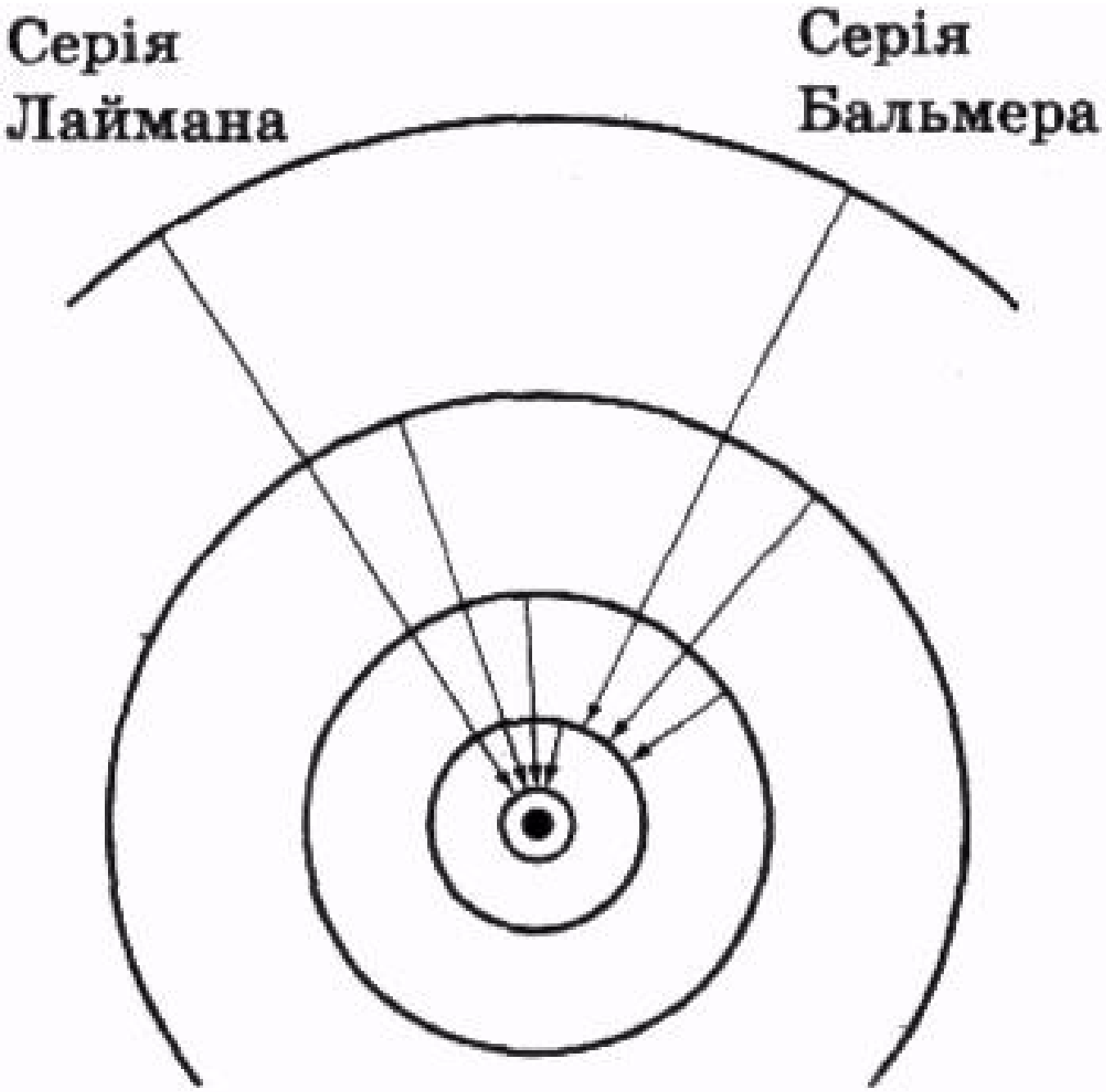
$$\Delta E \approx 1{,}6 \cdot 10^{-19}\,\text{Кл} \cdot 1\ \text{В} \approx 1{,}6 \cdot 10^{-19}\,\text{Дж}.$$

$$\Delta E = A = q\Delta\varphi,$$

$$\Delta E \approx 1{,}6 \cdot 10^{-19}\ \text{Кл} \cdot 1\ \text{В} \approx 1{,}6 \cdot 10^{-19}\ \text{Дж}.$$

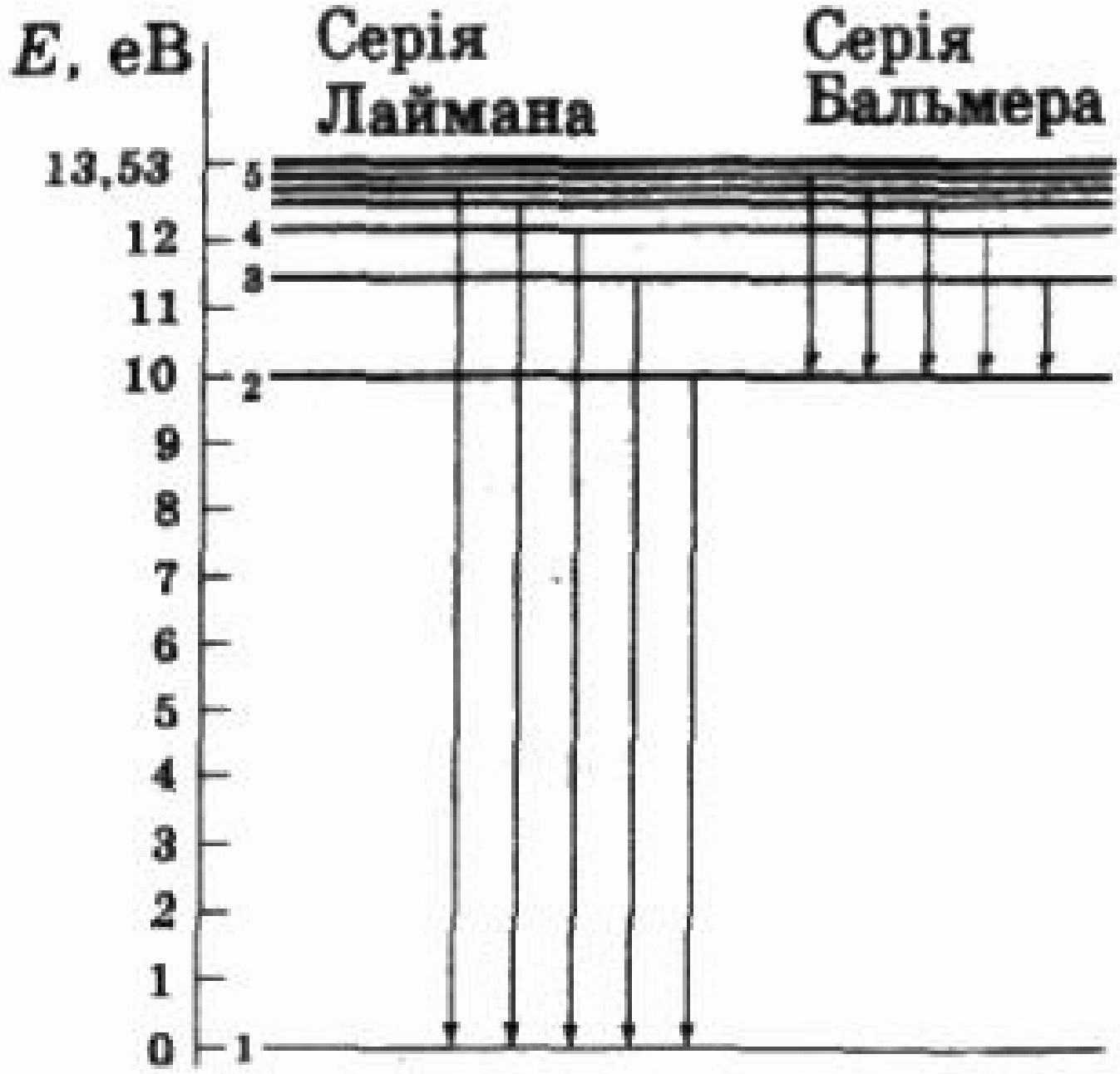
$$1\ \text{МеВ} = 10^6\ \text{еВ} \approx 1{,}6 \cdot 10^{-13}\ \text{Дж}.$$

$$1\ \text{МеВ} = 10^6\ \text{еВ} \approx 1{,}6 \cdot 10^{-13}\ \text{Дж}.$$

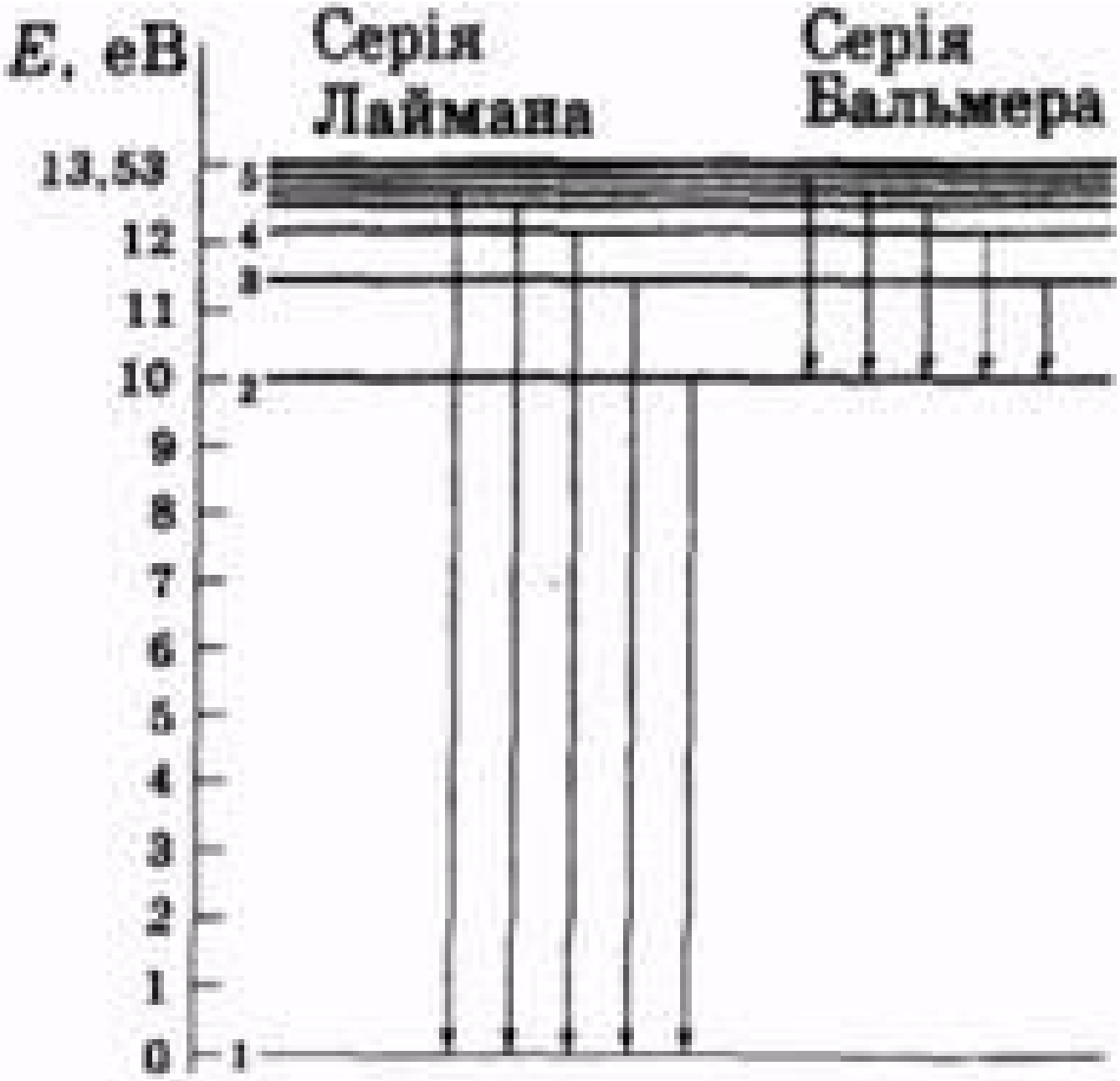


Мал. 2.219

Мал. 2.219


E, eB
Серія Лаймана
Серія Вальмера
13,53
12
11
10
9
8
7
6
5
4
3
2
1
0
5
4
3
2
1

Мал. 2.218


E, eB
Серія Лаймана
Серія Вальмера
13,53
12
11
10
9
8
7
6
5
4
3
2
1
0
5
4
3
2
1

Мал. 2.218

$$q = eZ \qquad \textbf{(60.1)},$$

$$q = eZ \qquad (60.1),$$

$$m_p = 1{,}672\,648\,5 \cdot 10^{-27}\ \text{кг}.$$

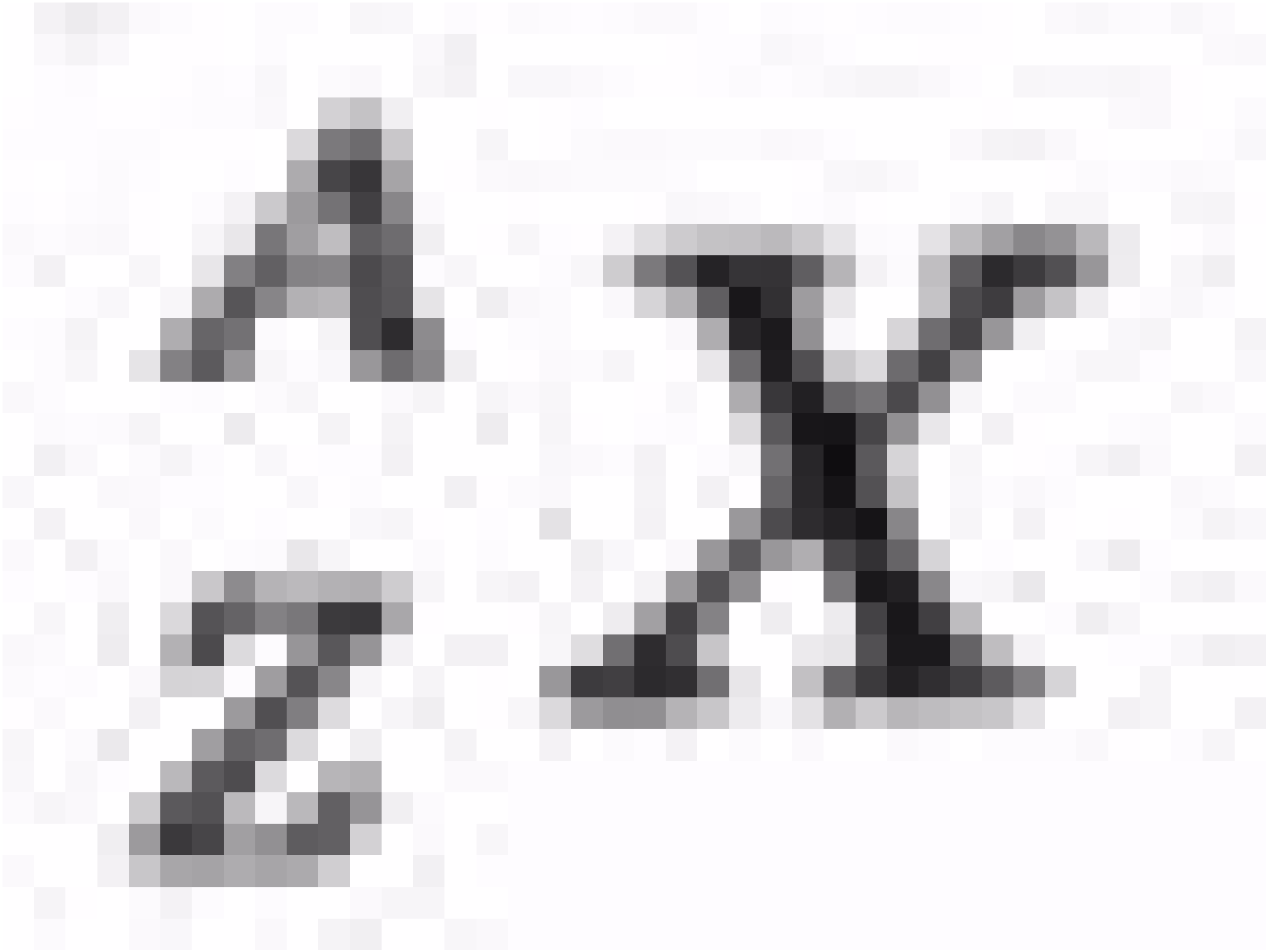
$$m_p = 1{,}672\,648\,5 \cdot 10^{-27}\ \text{кг}.$$

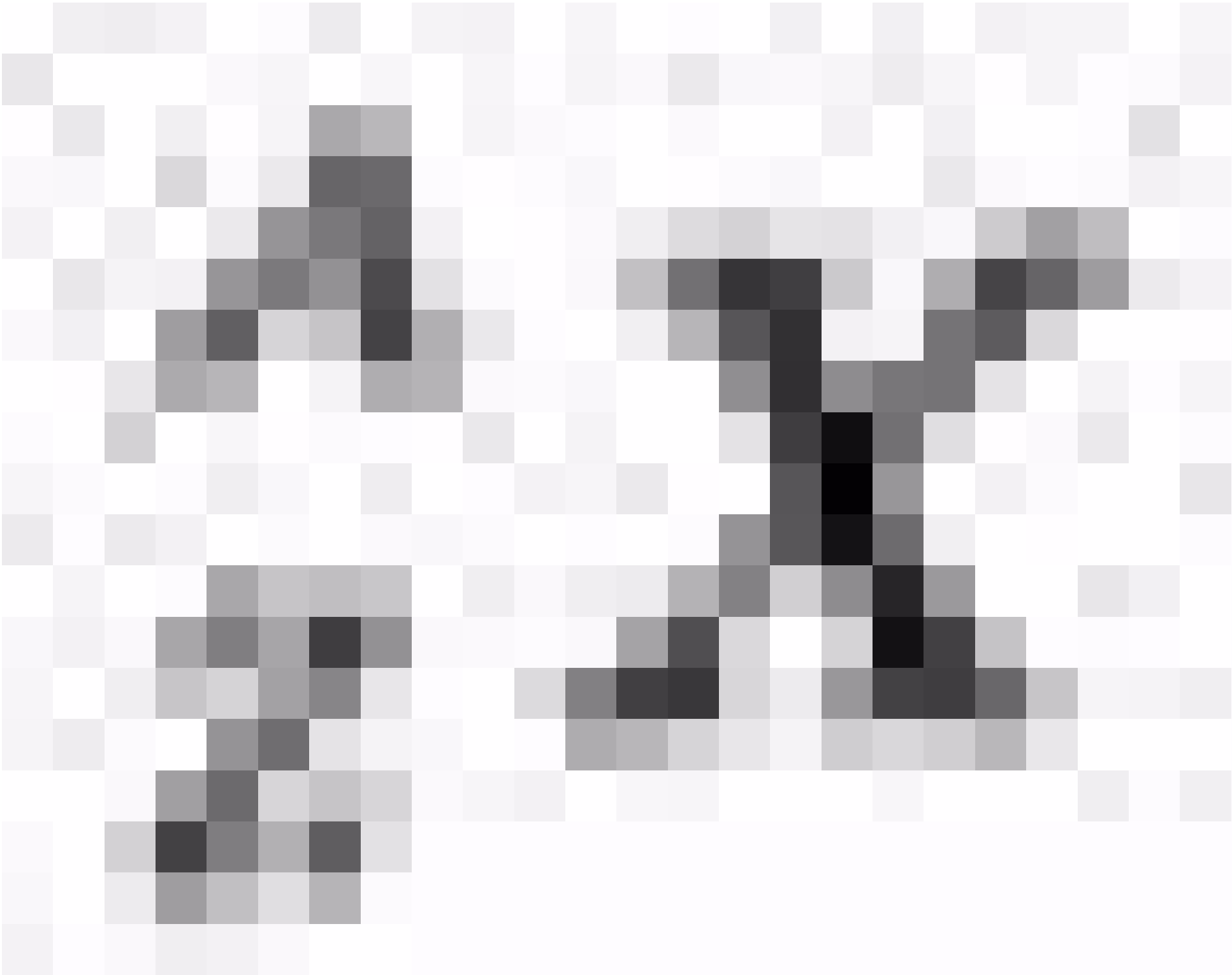
$$m_n = 1{,}674\,954\,3 \cdot 10^{-27} \text{ кг.}$$

$$m_n = 1{,}674\,954\,3 \cdot 10^{-27}\ \text{кг}.$$

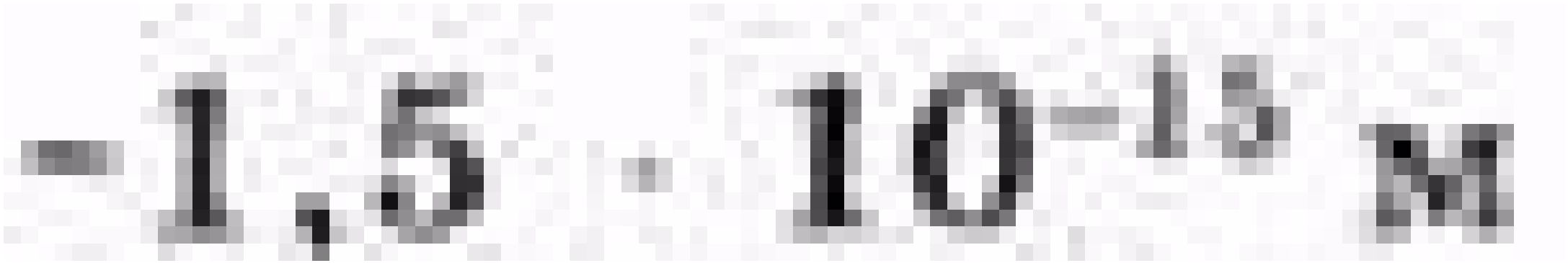
$$A = Z + N \qquad (60.2).$$

$$A = Z + N \qquad (60.2).$$



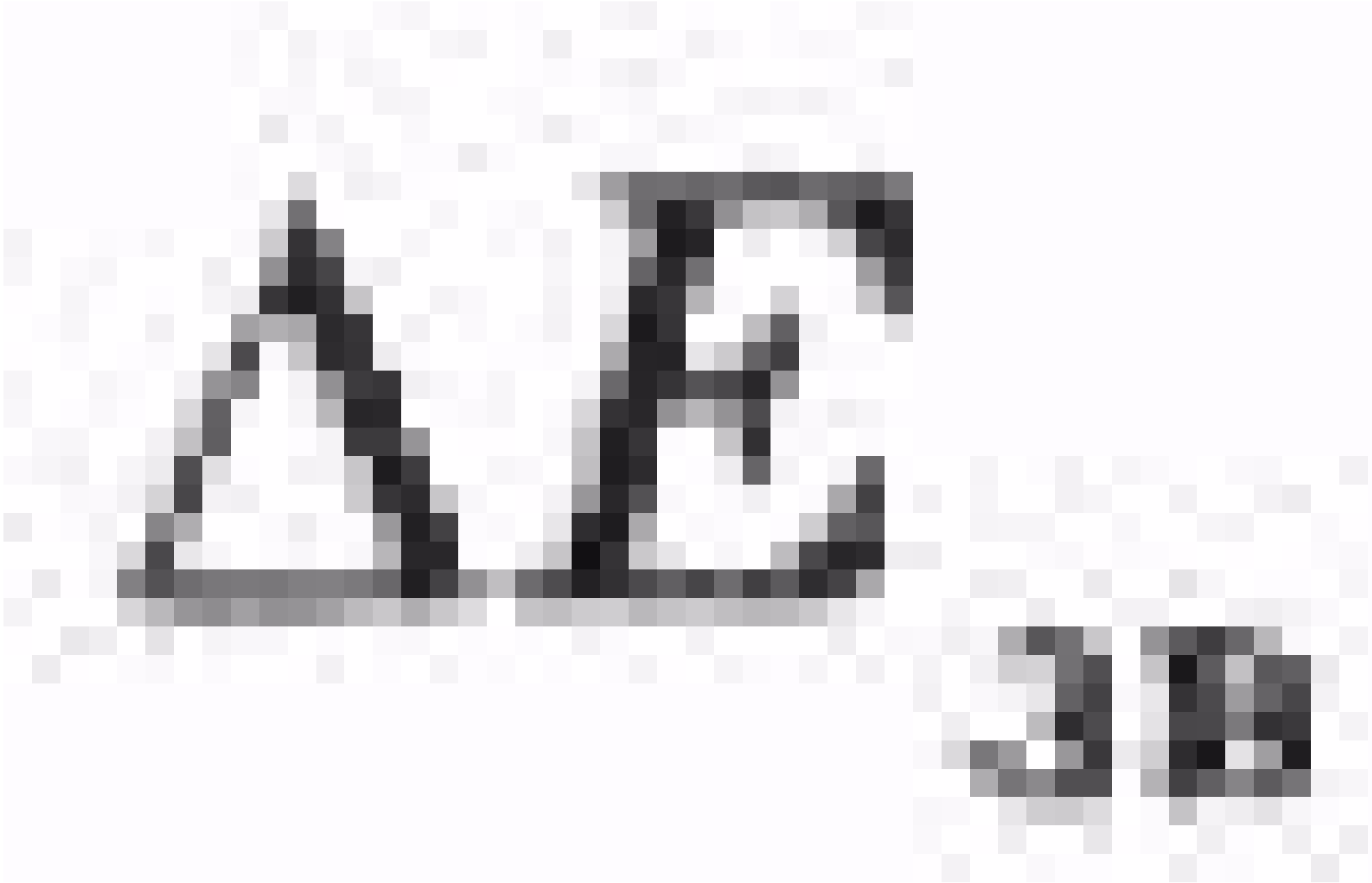


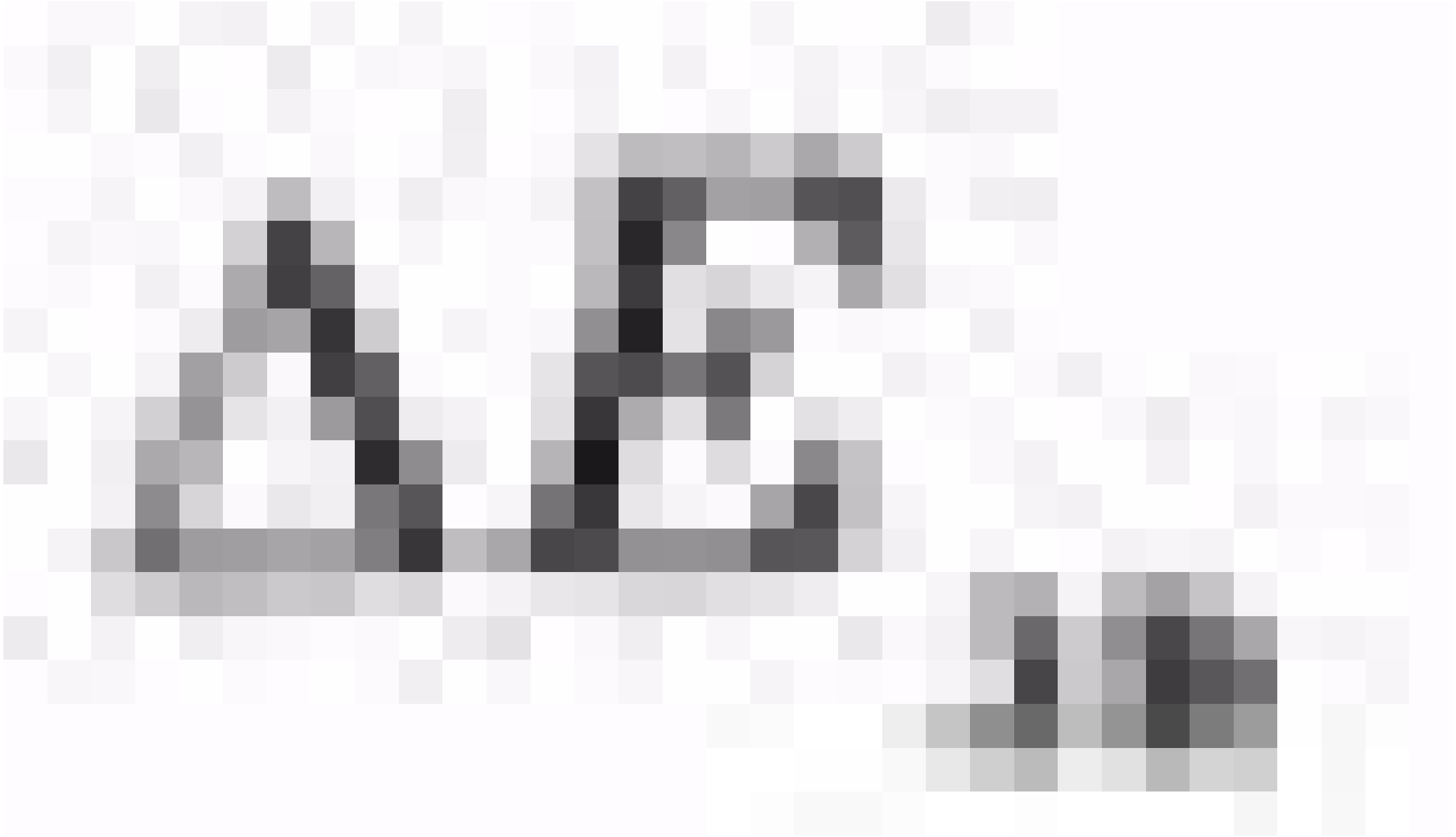
$$\sim 1{,}5 \cdot 10^{-15}\ \mathrm{m}$$

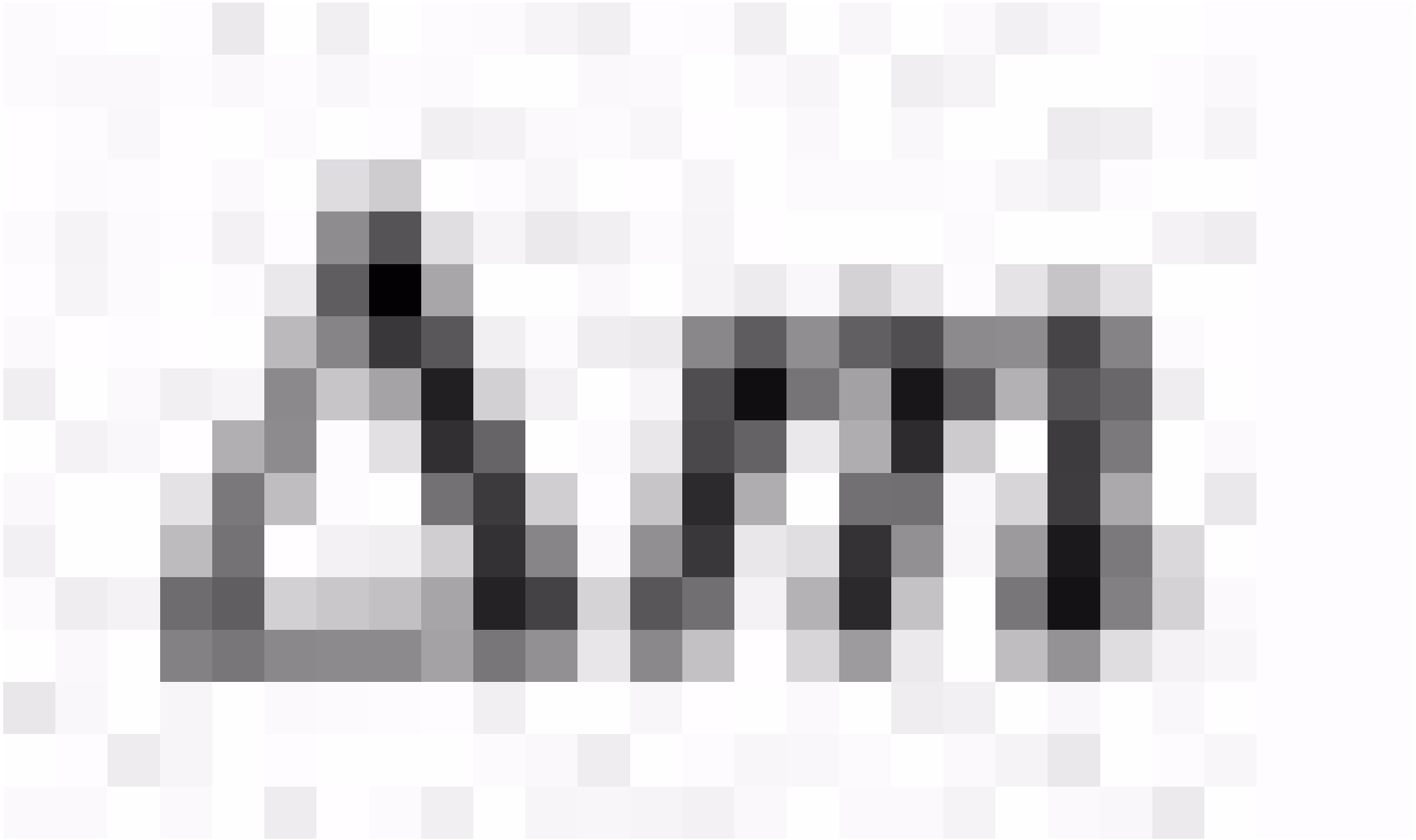


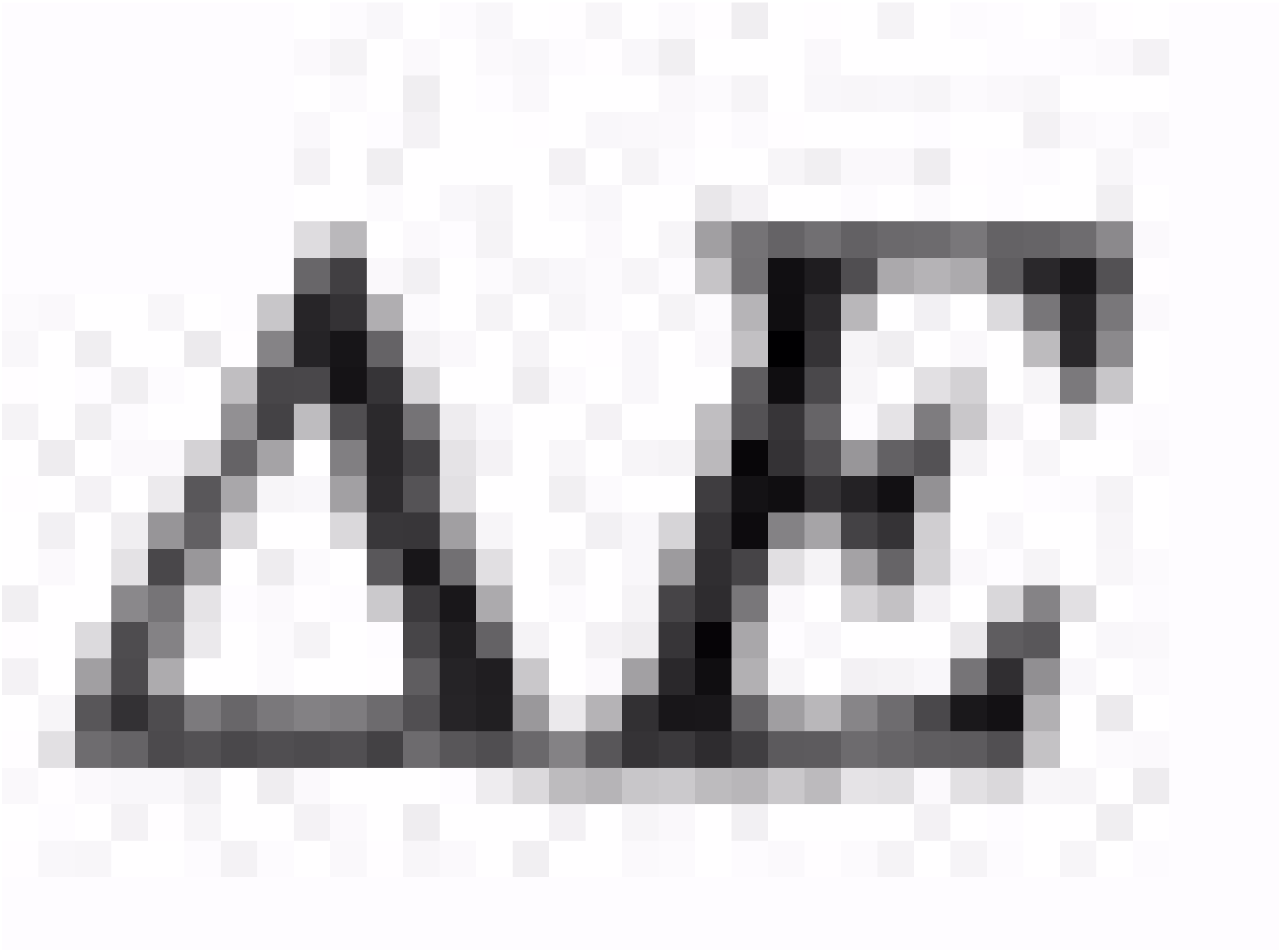
$$f = \frac{\Delta E_{3B}}{A} \qquad (60.3).$$

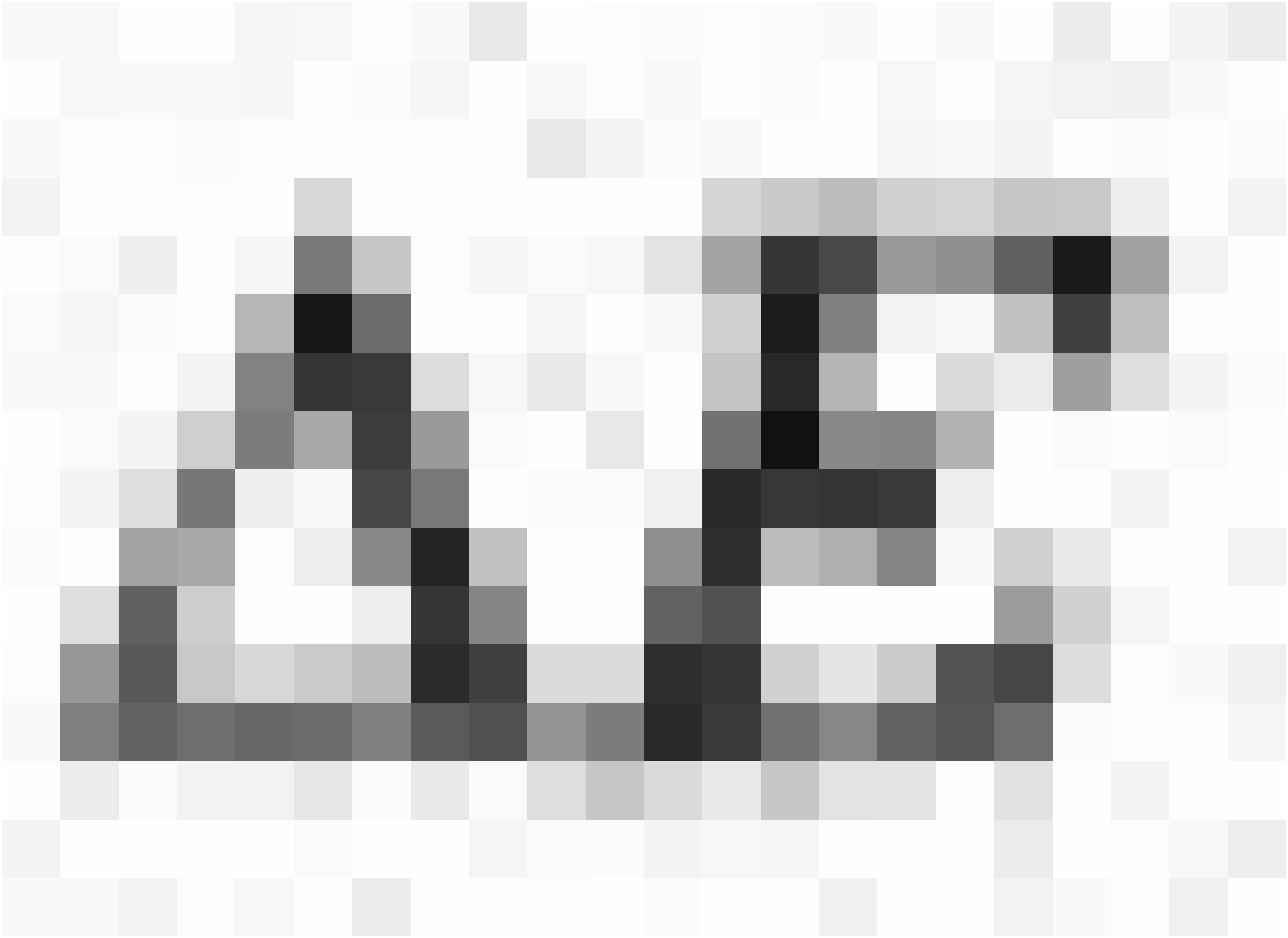
$$f = \frac{\Delta E_{\text{эв}}}{A} \qquad (60.3).$$





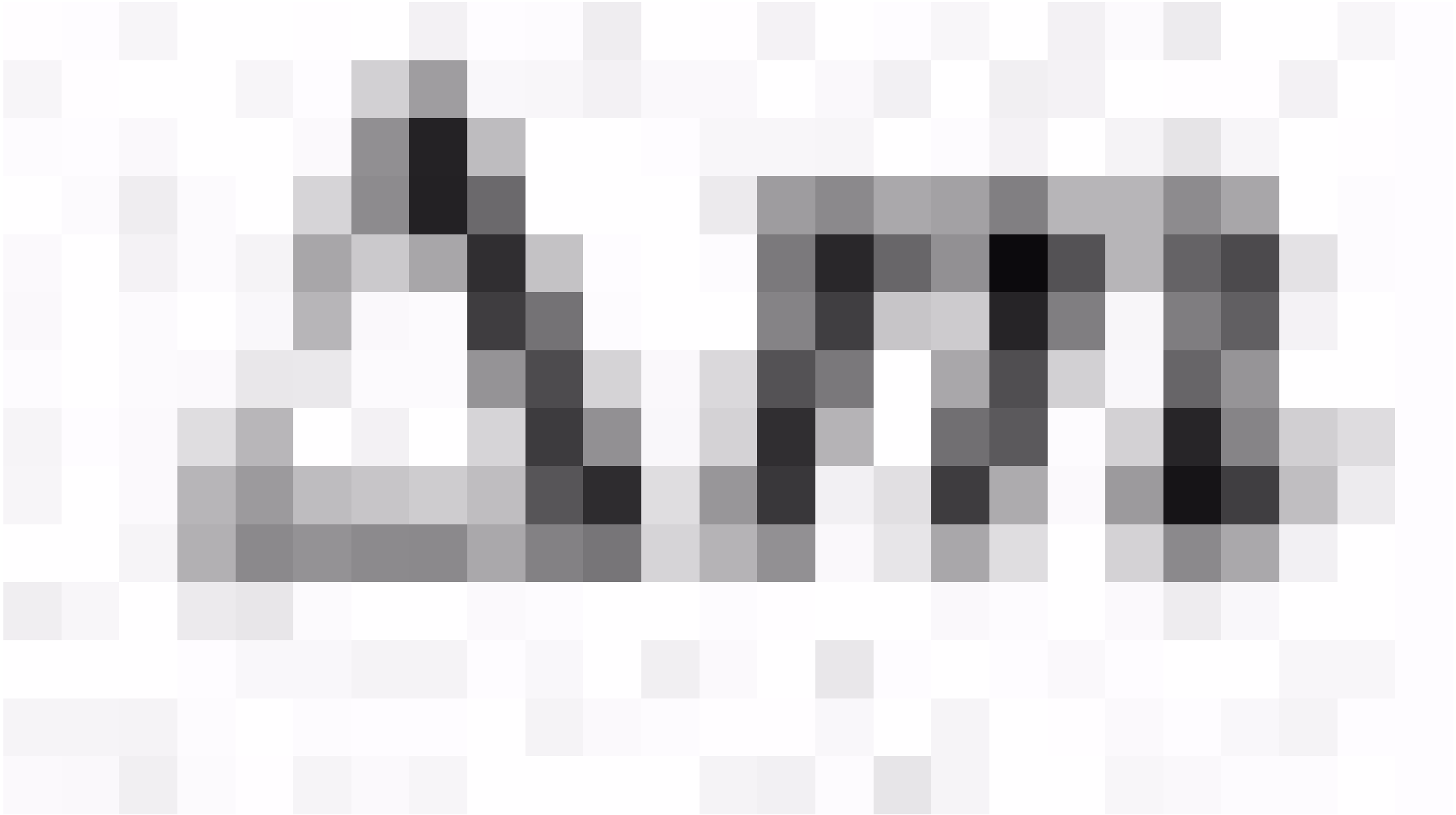


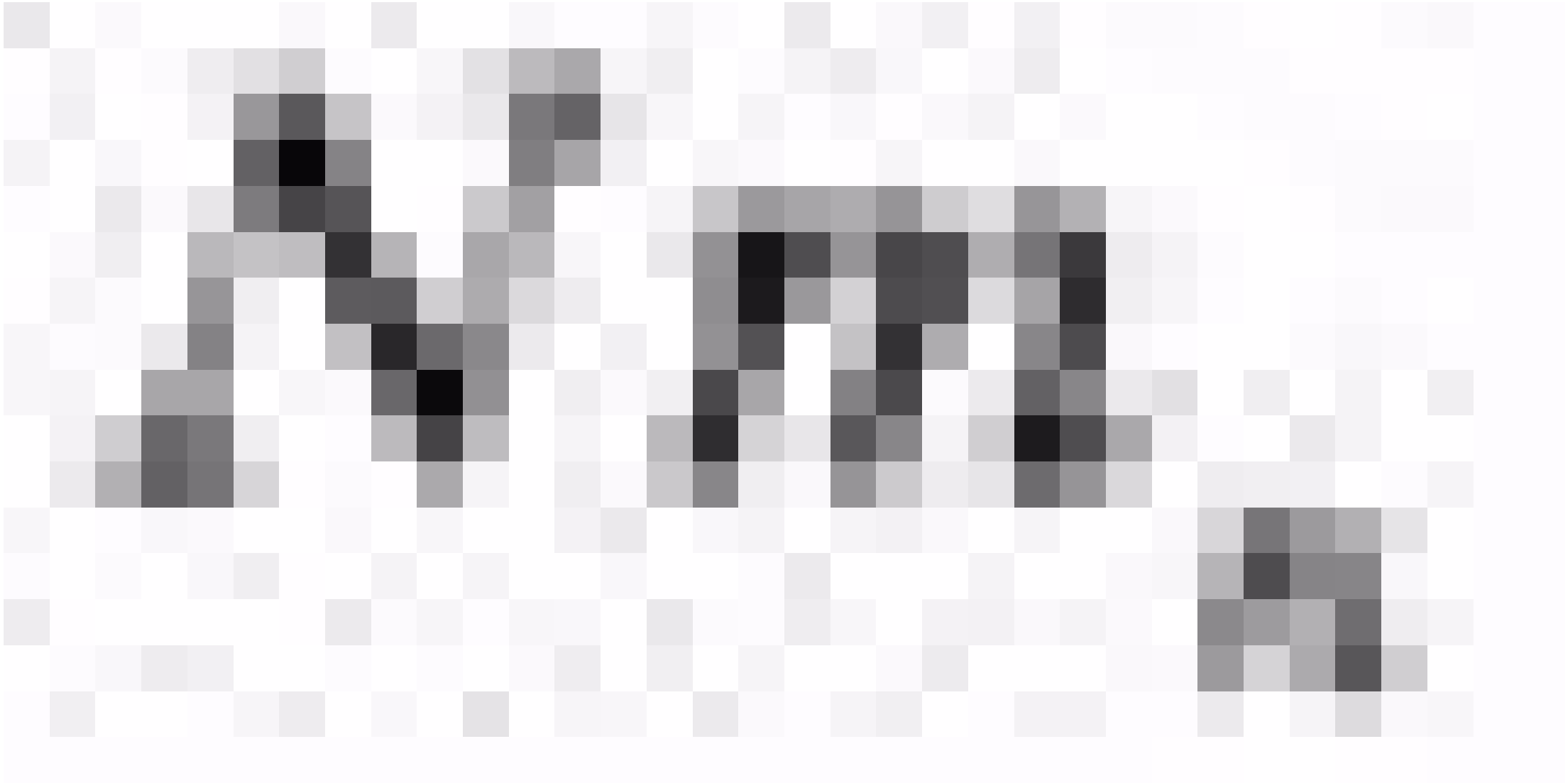




$$\Delta E_{\text{çà}} = \frac{\Delta m}{c^2} \qquad (60.4).$$

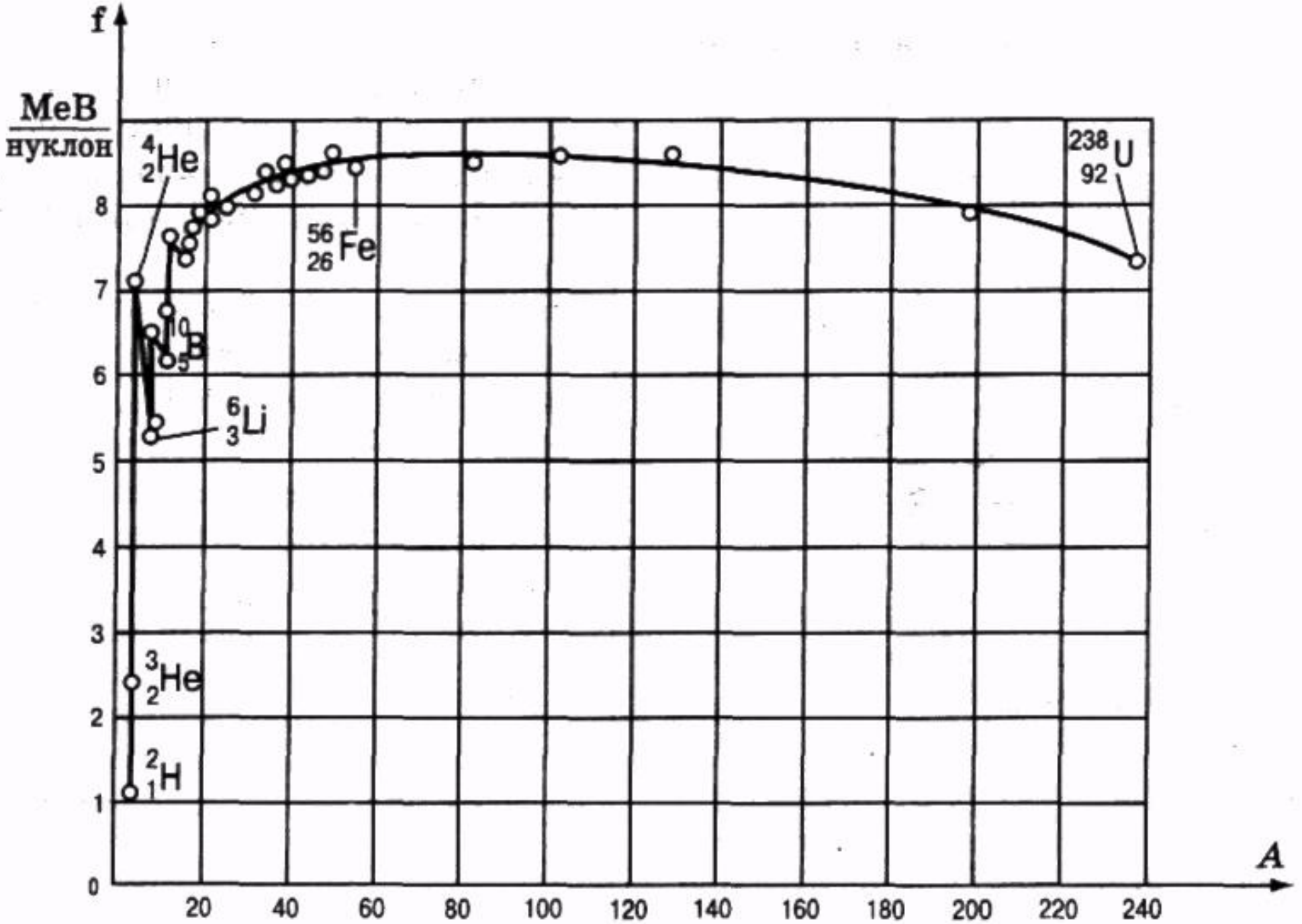
$$\Delta E_{cb} = \frac{\Delta m}{c^2} \qquad (60.4).$$



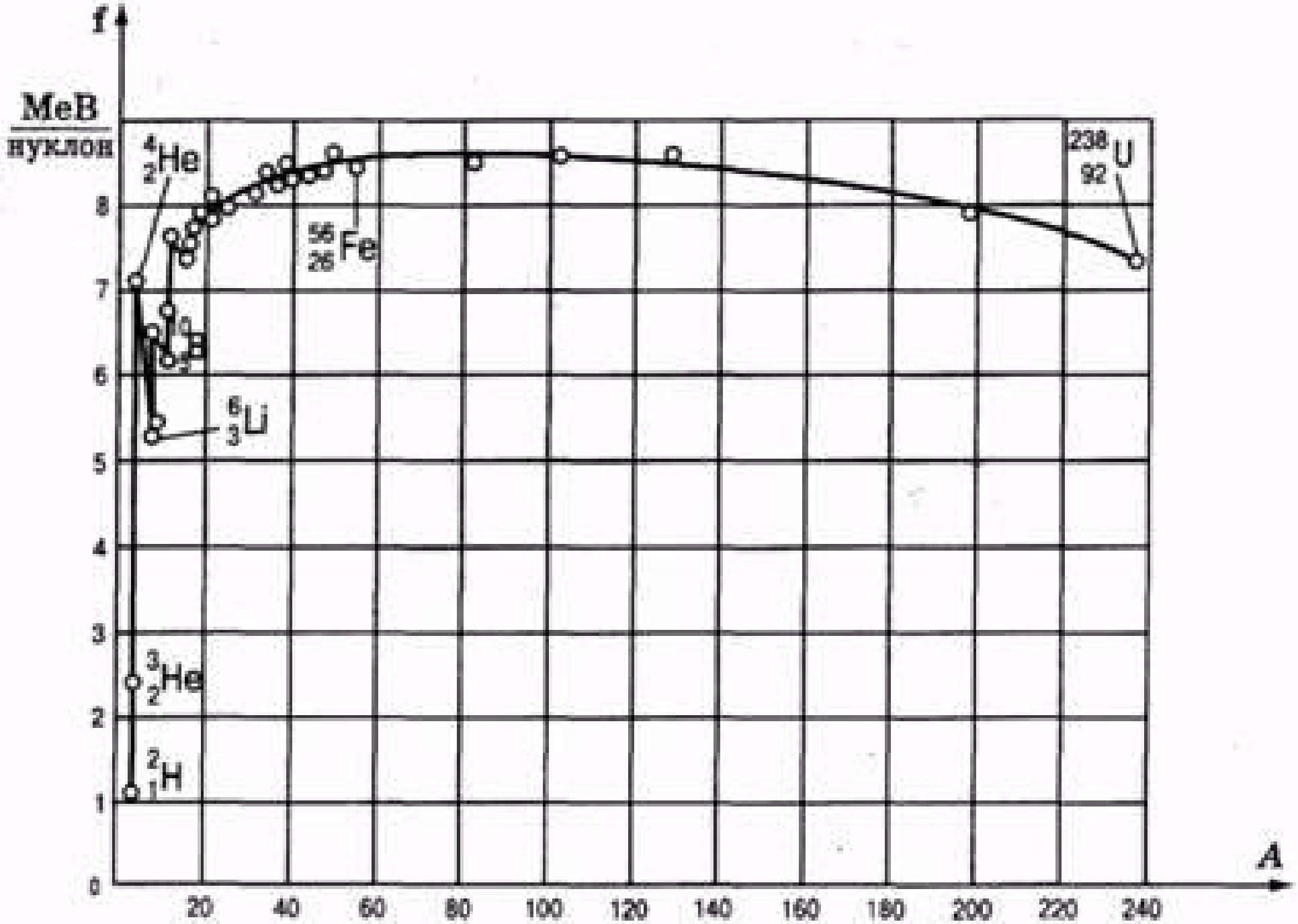


$$\Delta m = Z\ddot{m}_p + N m_n - m_я \qquad (60.5).$$

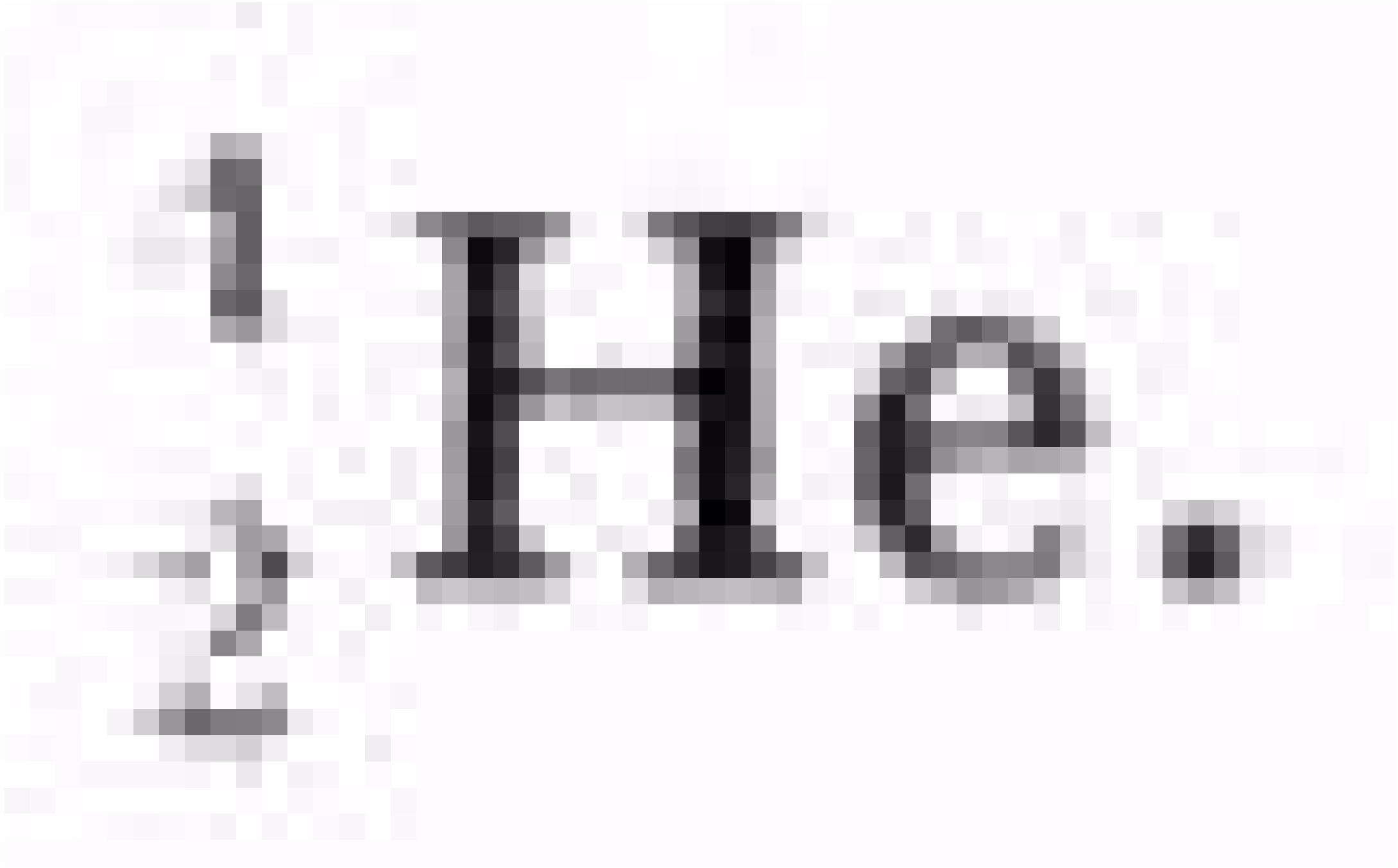
$$\Delta m = Z\bar{m}_p + N m_n - m_x \qquad (60.5).$$

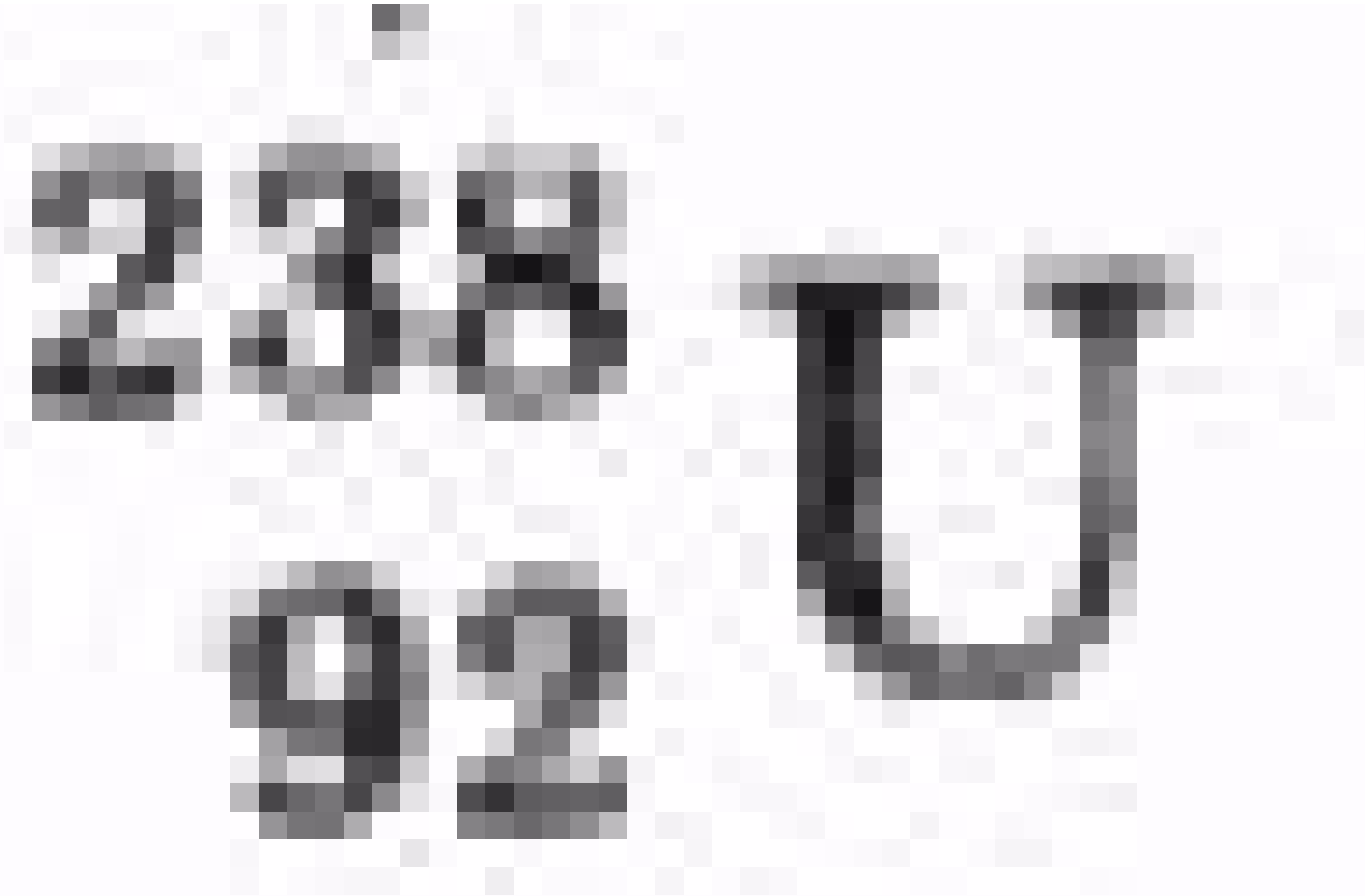

f
МеВ
нуклон
$^{4}_{2}$He
$^{56}_{26}$Fe
$^{238}_{92}$U
$^{10}_{5}$B
$^{6}_{3}$Li
$^{3}_{2}$He
$^{2}_{1}$H
A
0
1
2
3
4
5
6
7
8
20
40
60
80
100
120
140
160
180
200
220
240

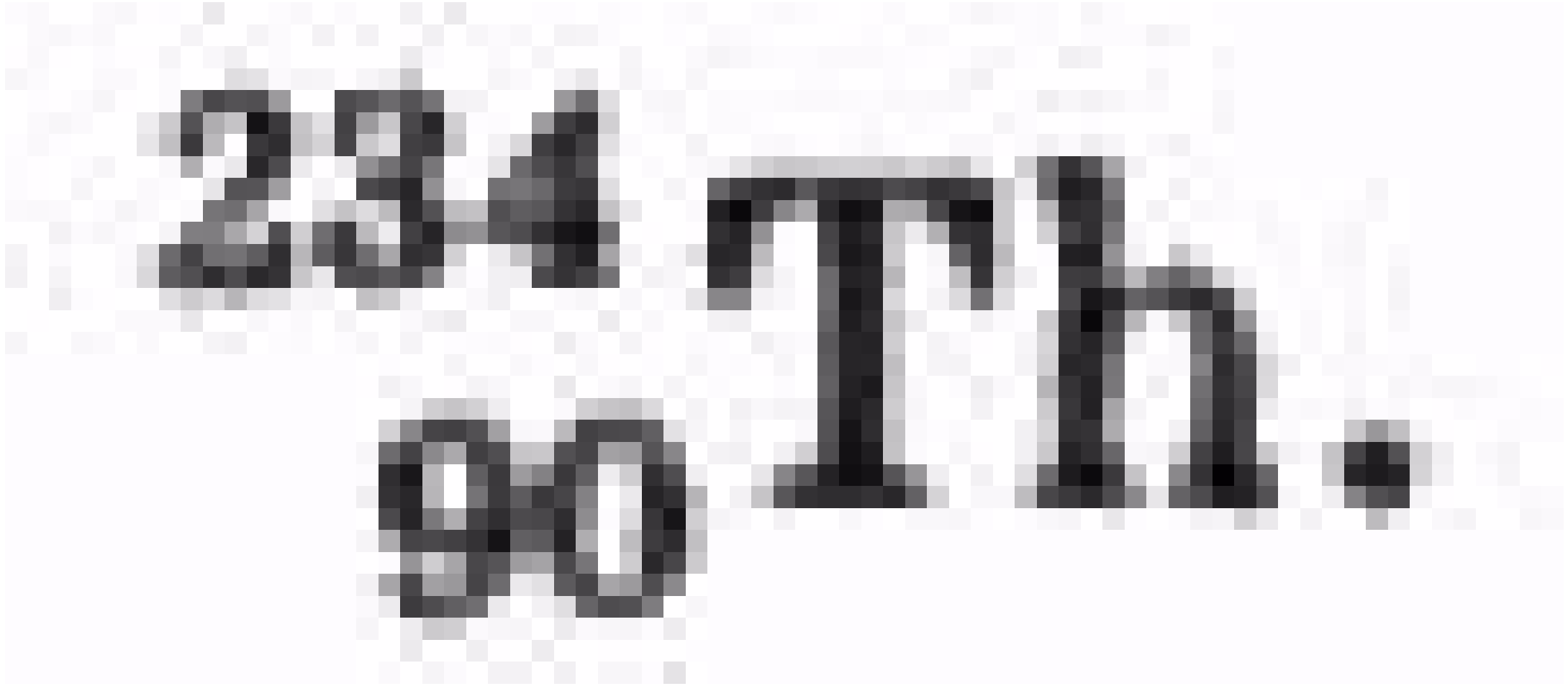
Мал. 2.220

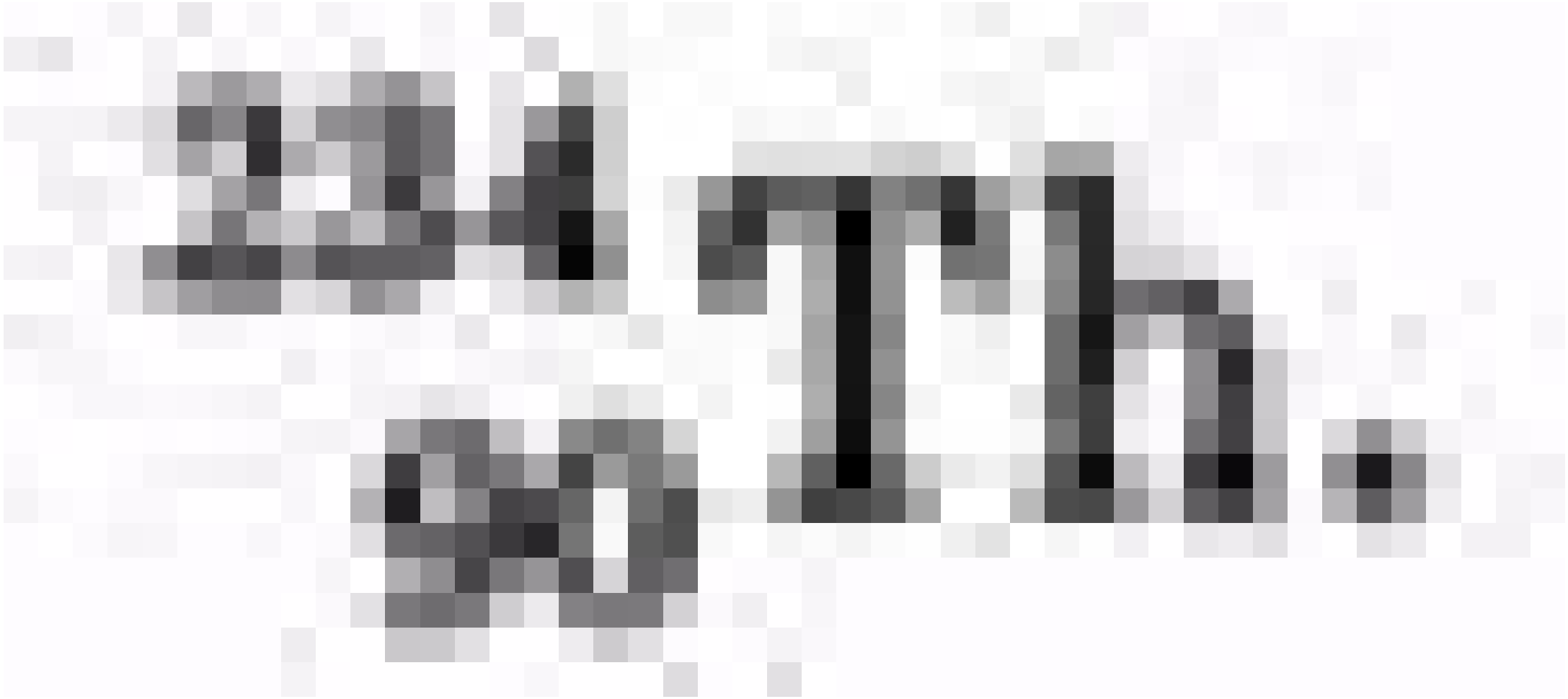

f
МеВ
нуклон
$^{4}_{2}$He
$^{56}_{26}$Fe
$^{238}_{92}$U
$^{6}_{3}$Li
$^{3}_{2}$He
$^{2}_{1}$H
A
0
1
2
3
4
5
6
7
8
20
40
60
80
100
120
140
160
180
200
220
240

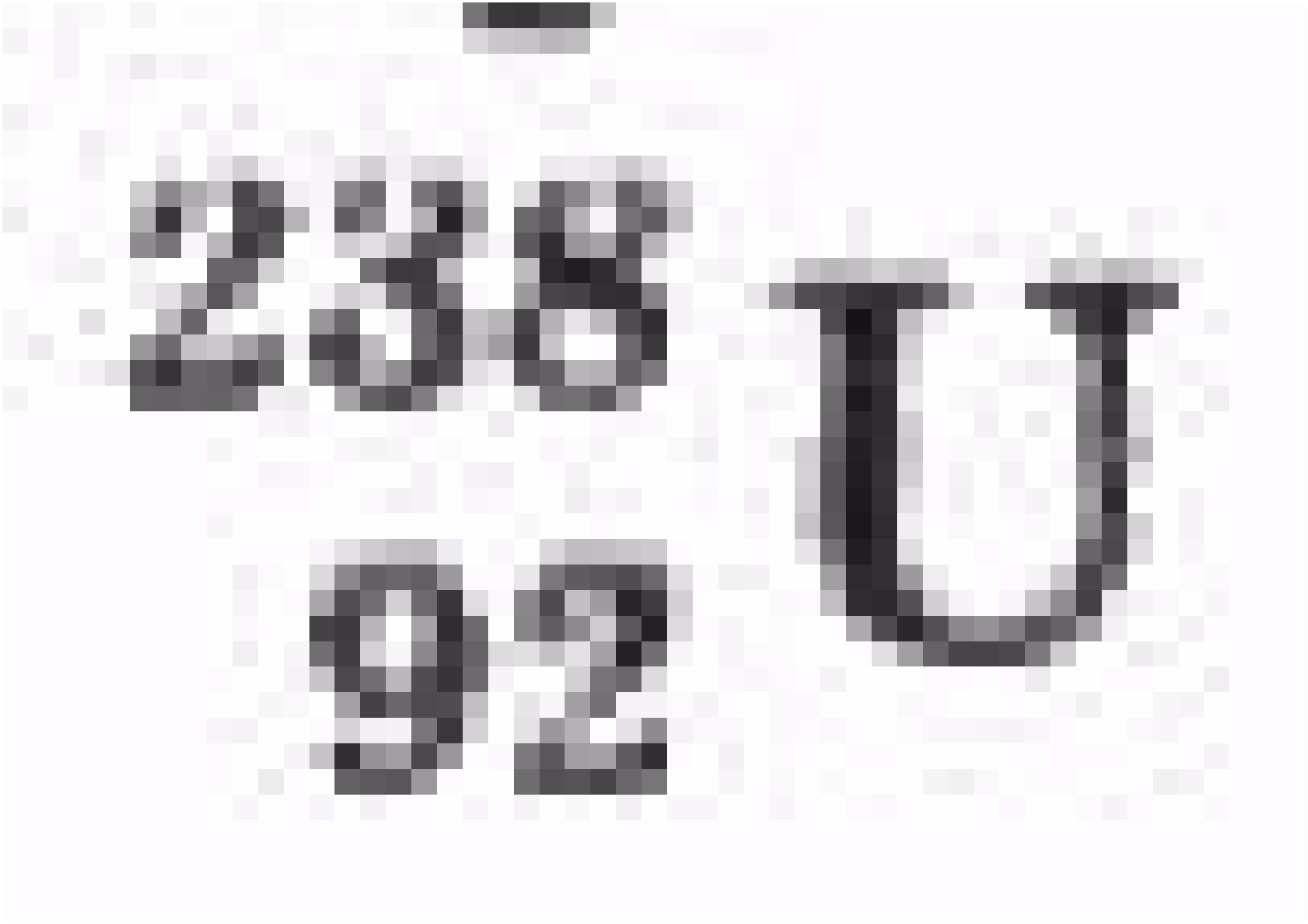
Мал. 2.220




2022
07

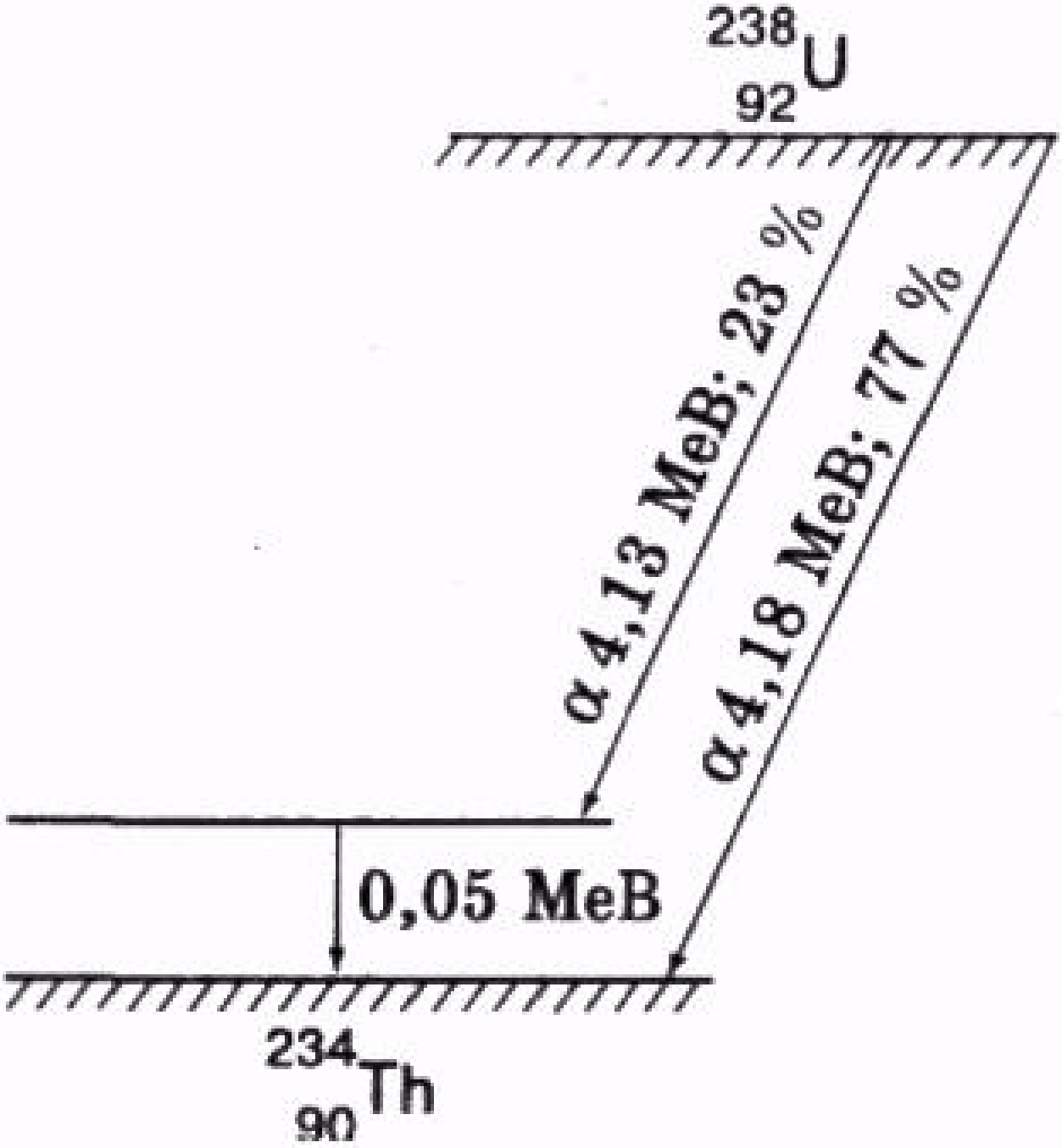






$$m_x c^2 > m_y c^2 + m_\alpha c^2$$

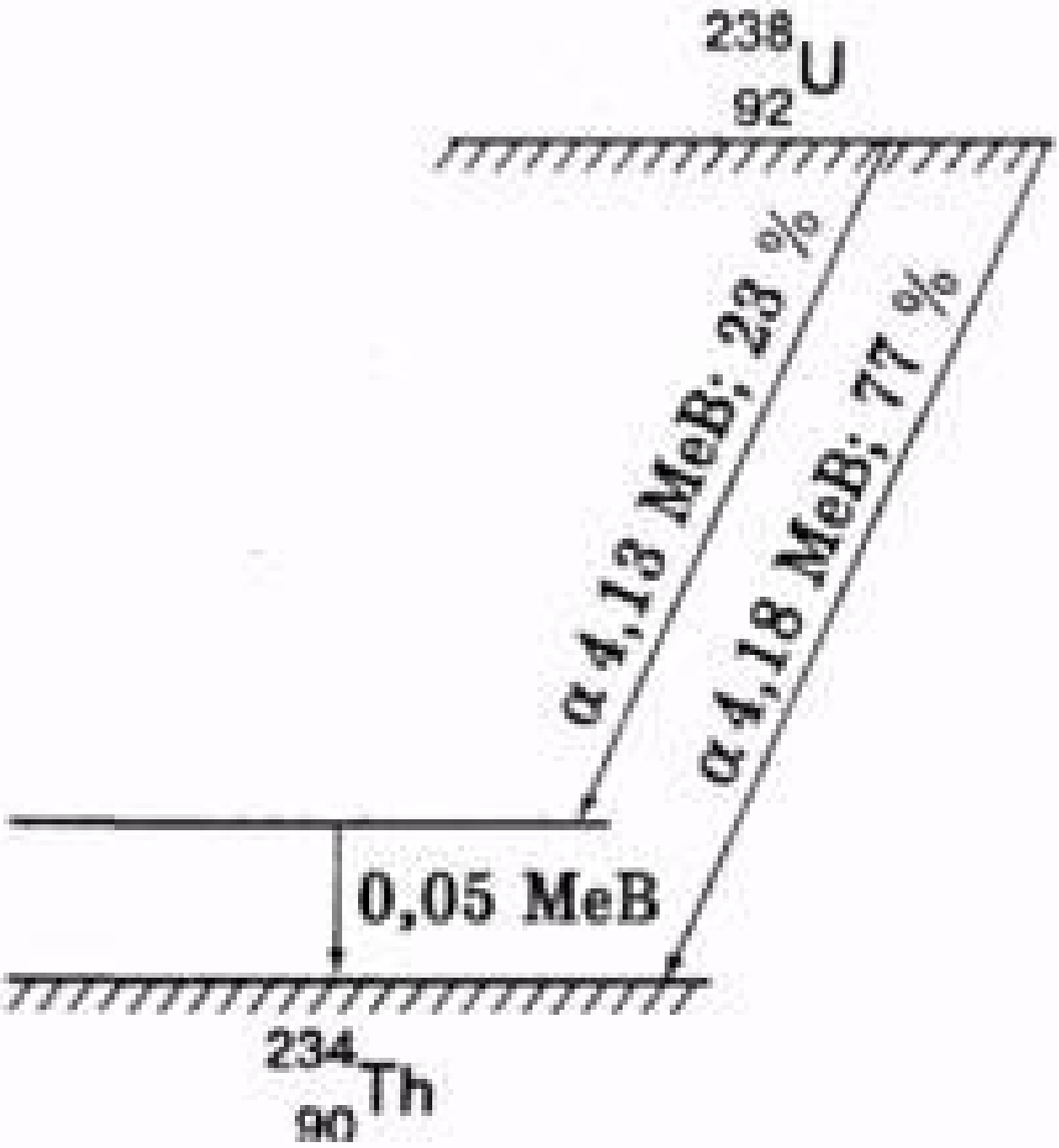
або $m_x > m_y + m_\alpha$.



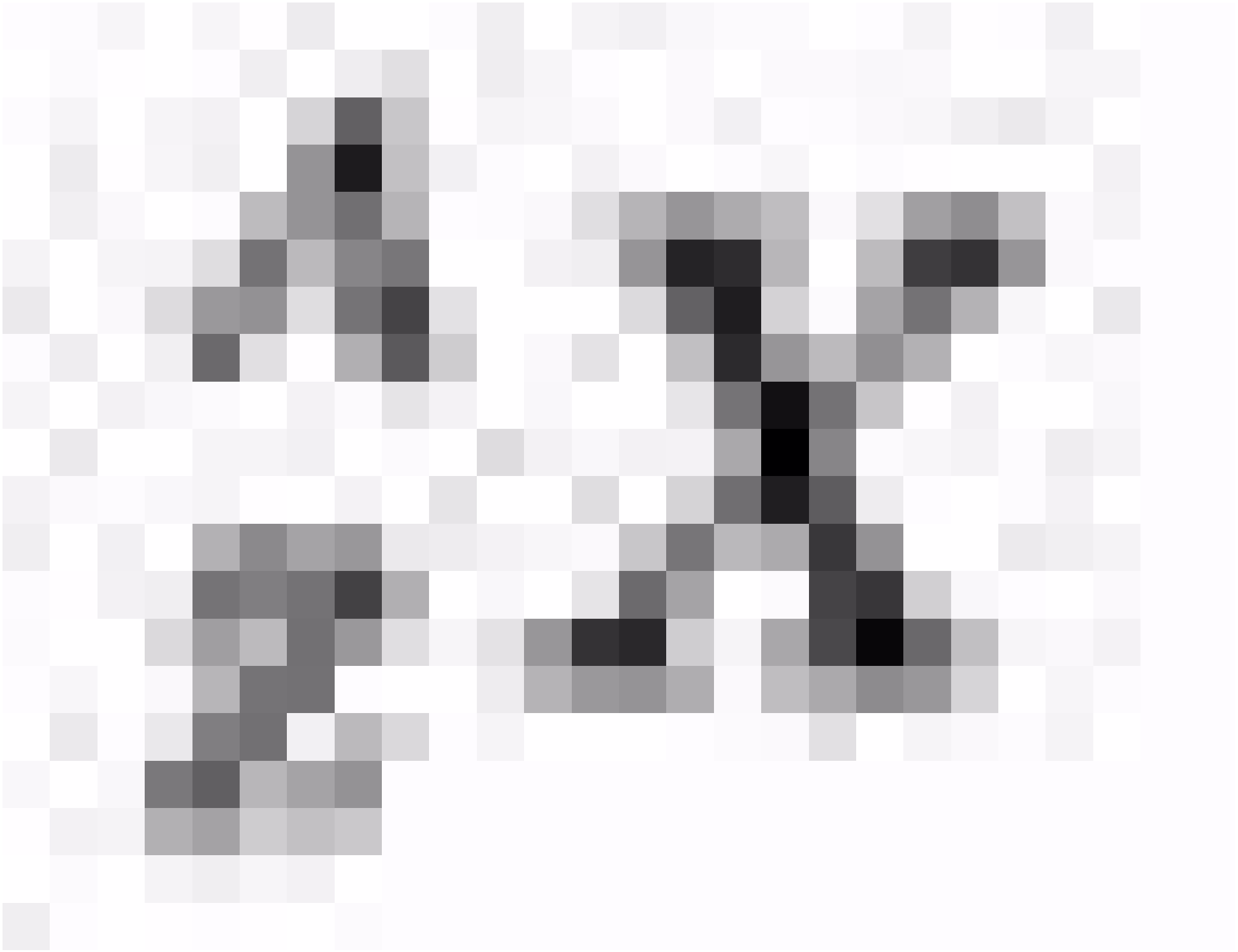
Мал. 2.221

$$m_x c^2 > m_y c^2 + m_\alpha c^2$$

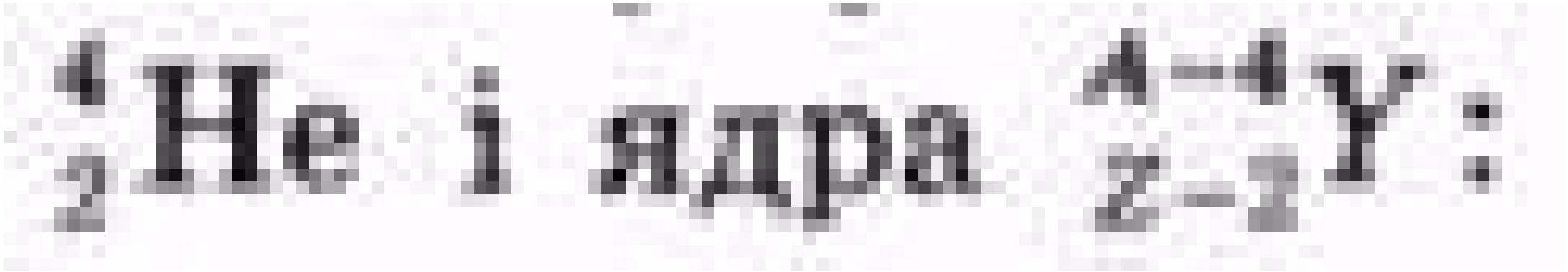
або $m_x > m_y + m_\alpha$.

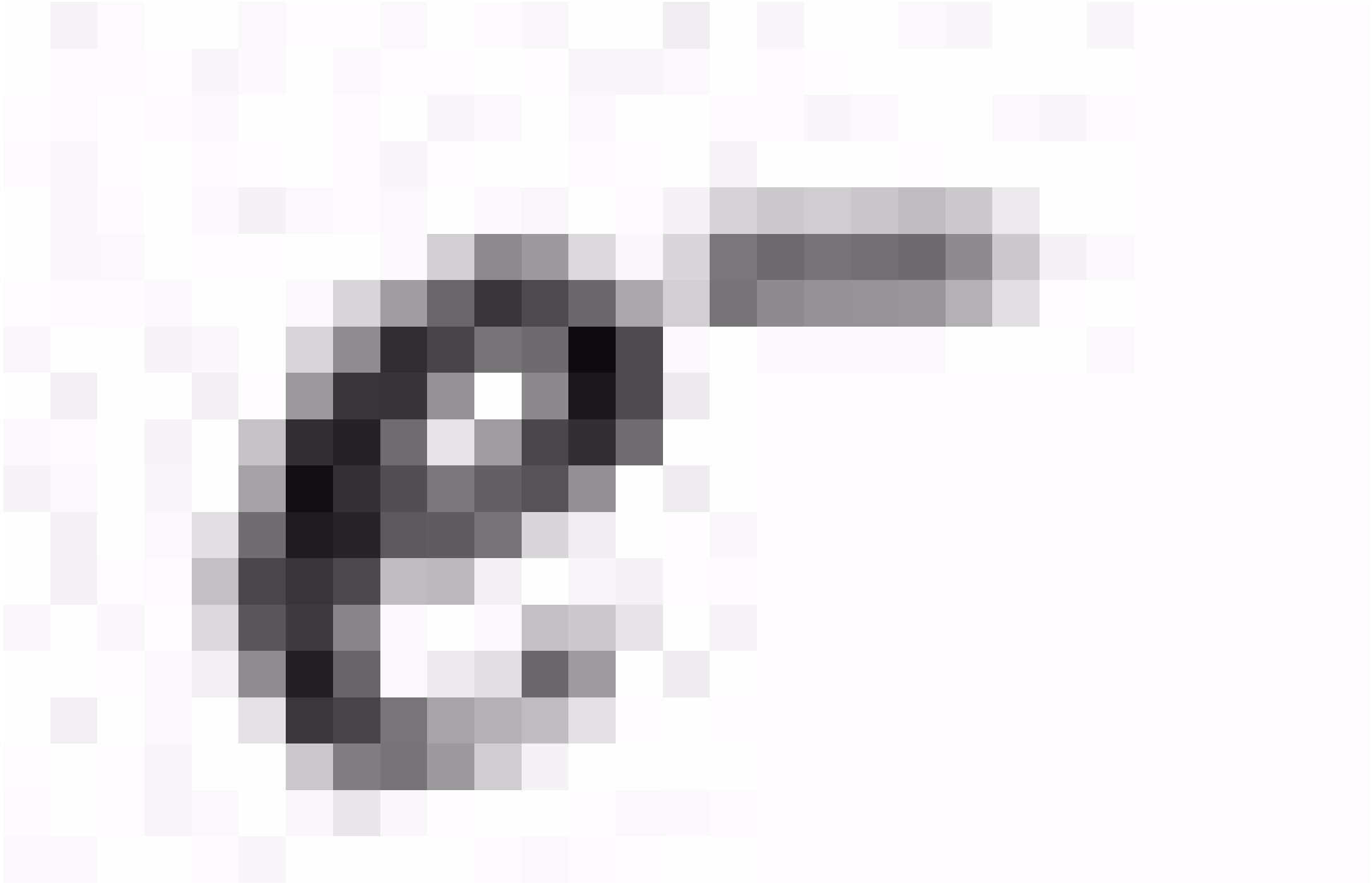


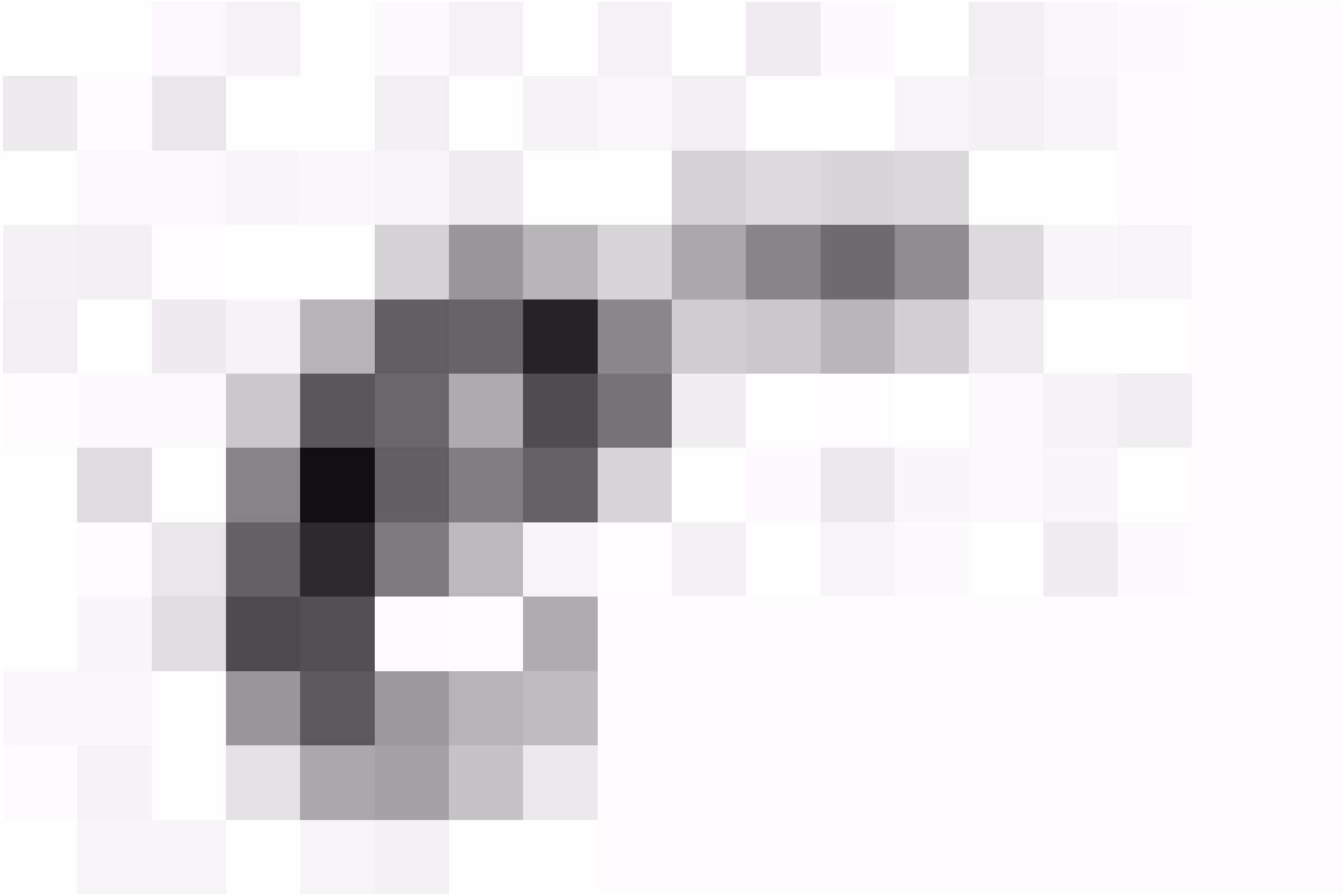
Мал. 2.221



$^{4}_{2}\mathrm{He}$ і ядра $^{A-4}_{Z-2}Y$:

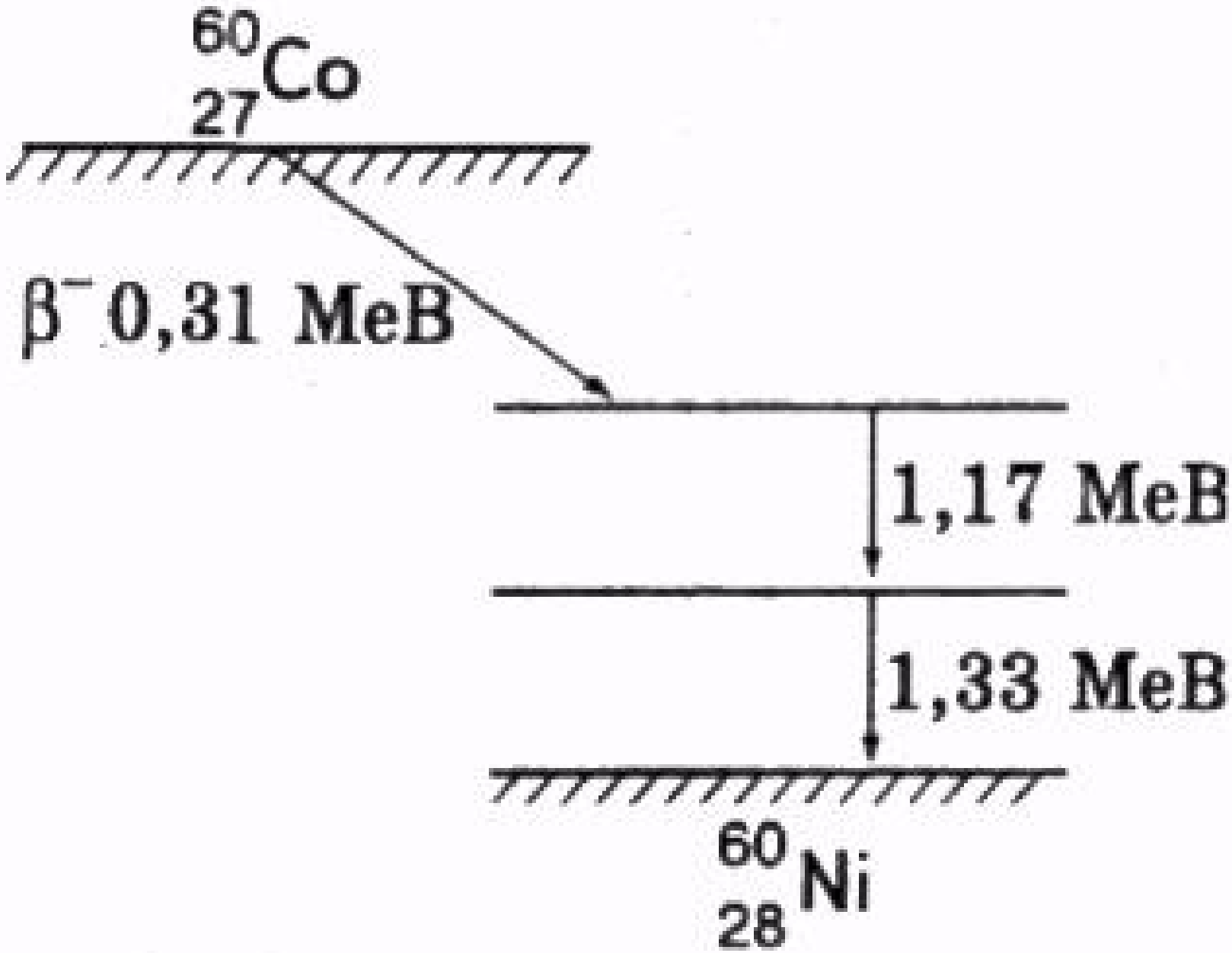




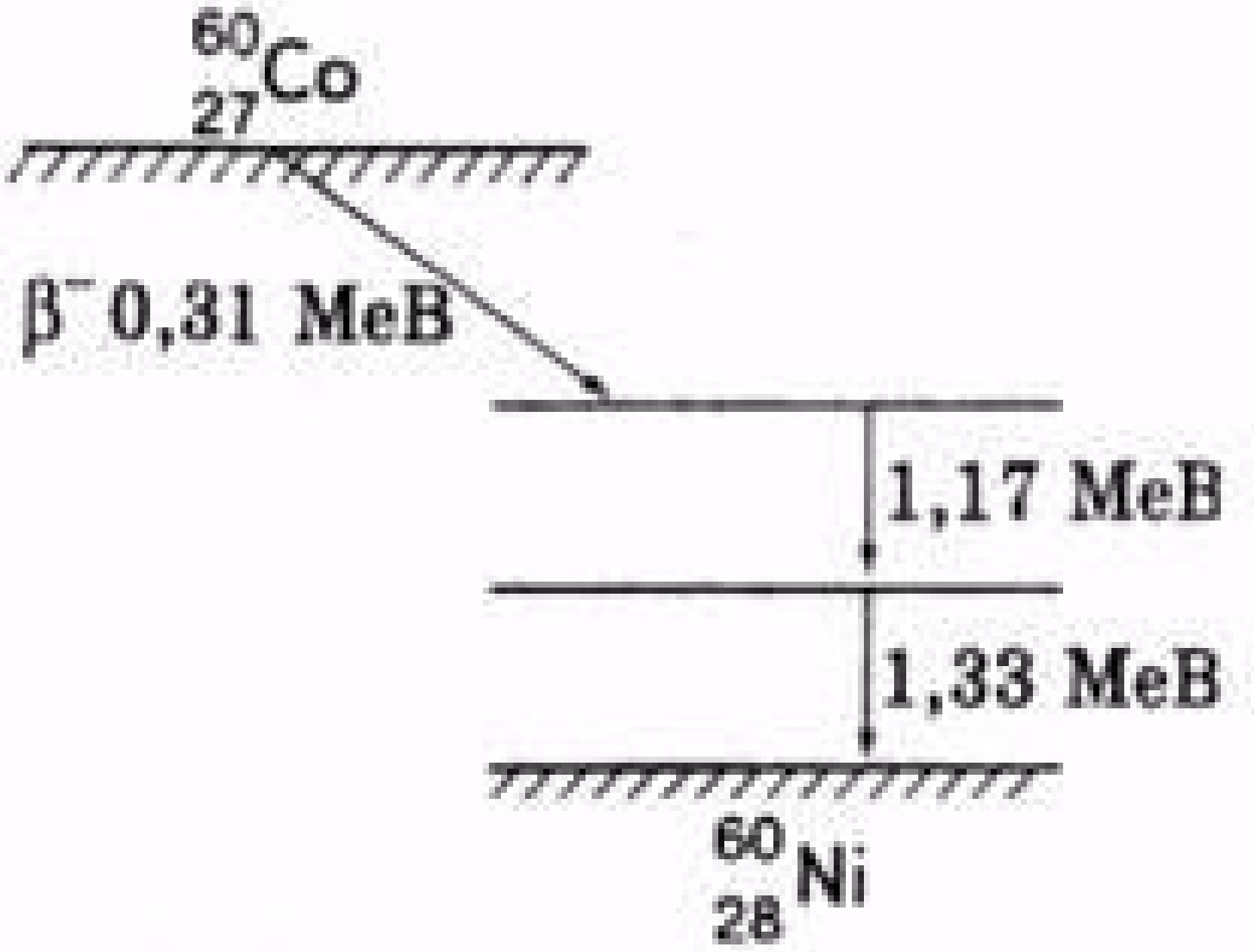


$$n \rightarrow p + e^{-} + \tilde{\nu} \qquad (61.1).$$

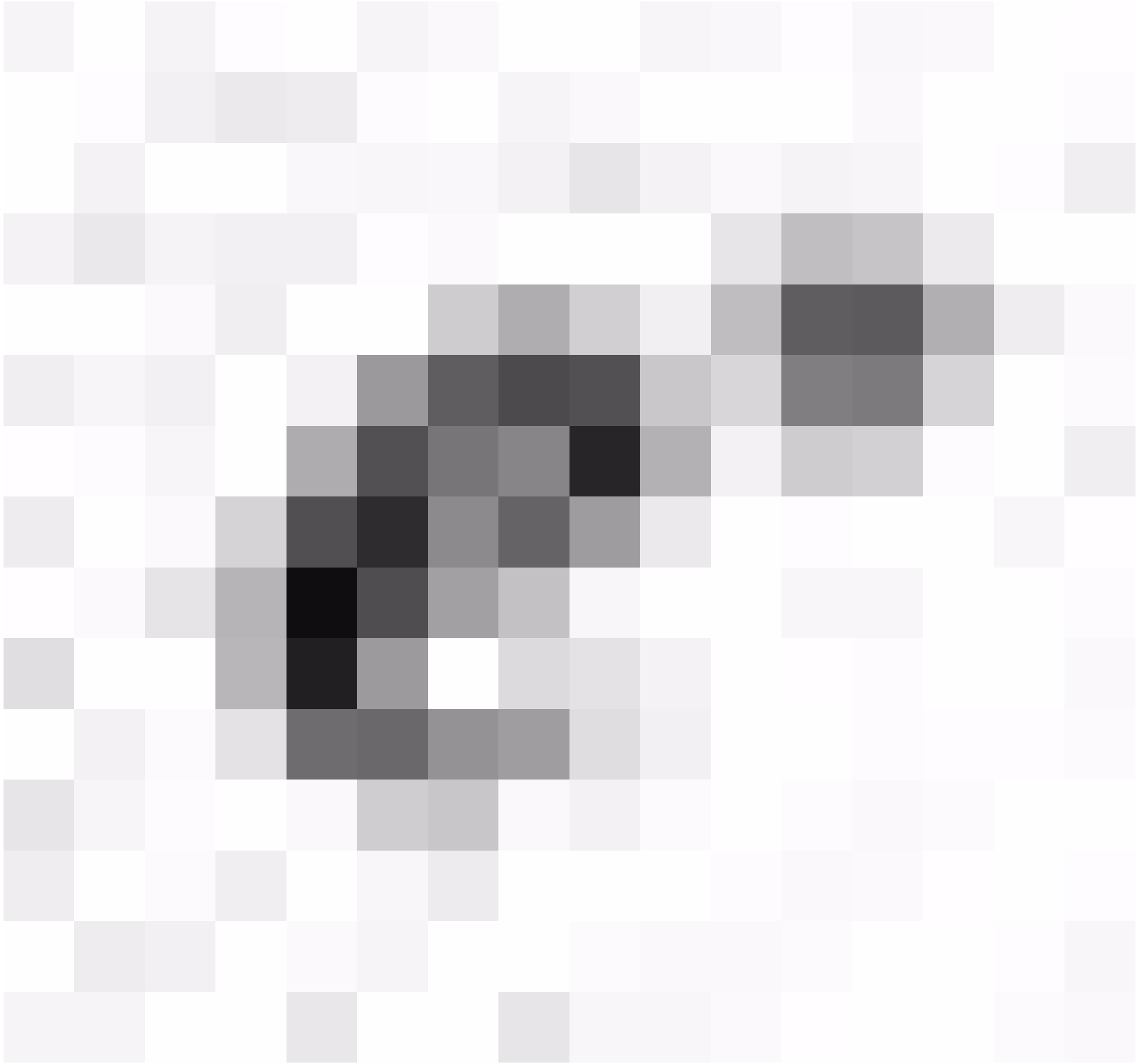
$$n \rightarrow p + e^{-} + \bar{\nu} \qquad (61.1).$$

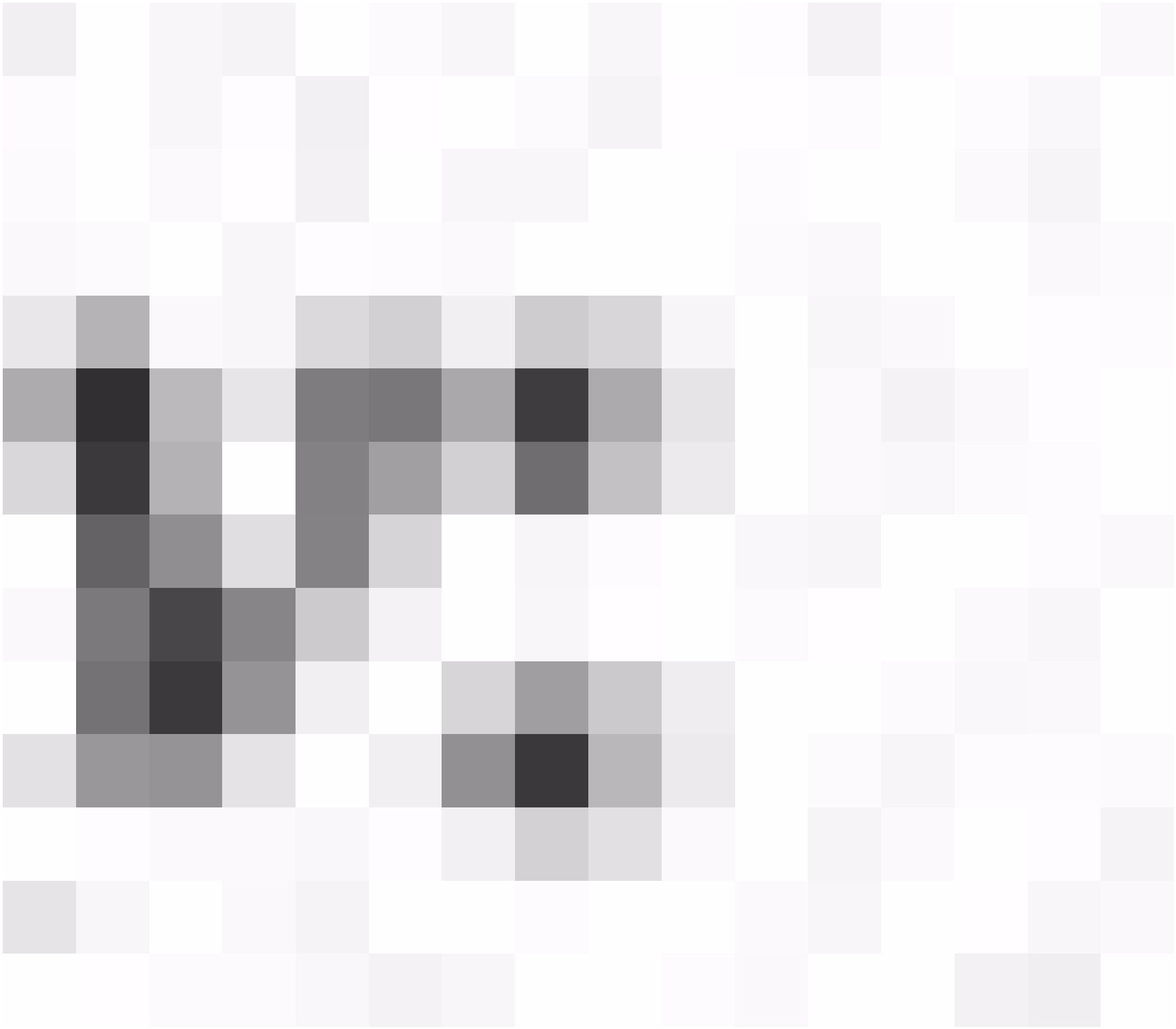


Мал. 2.222



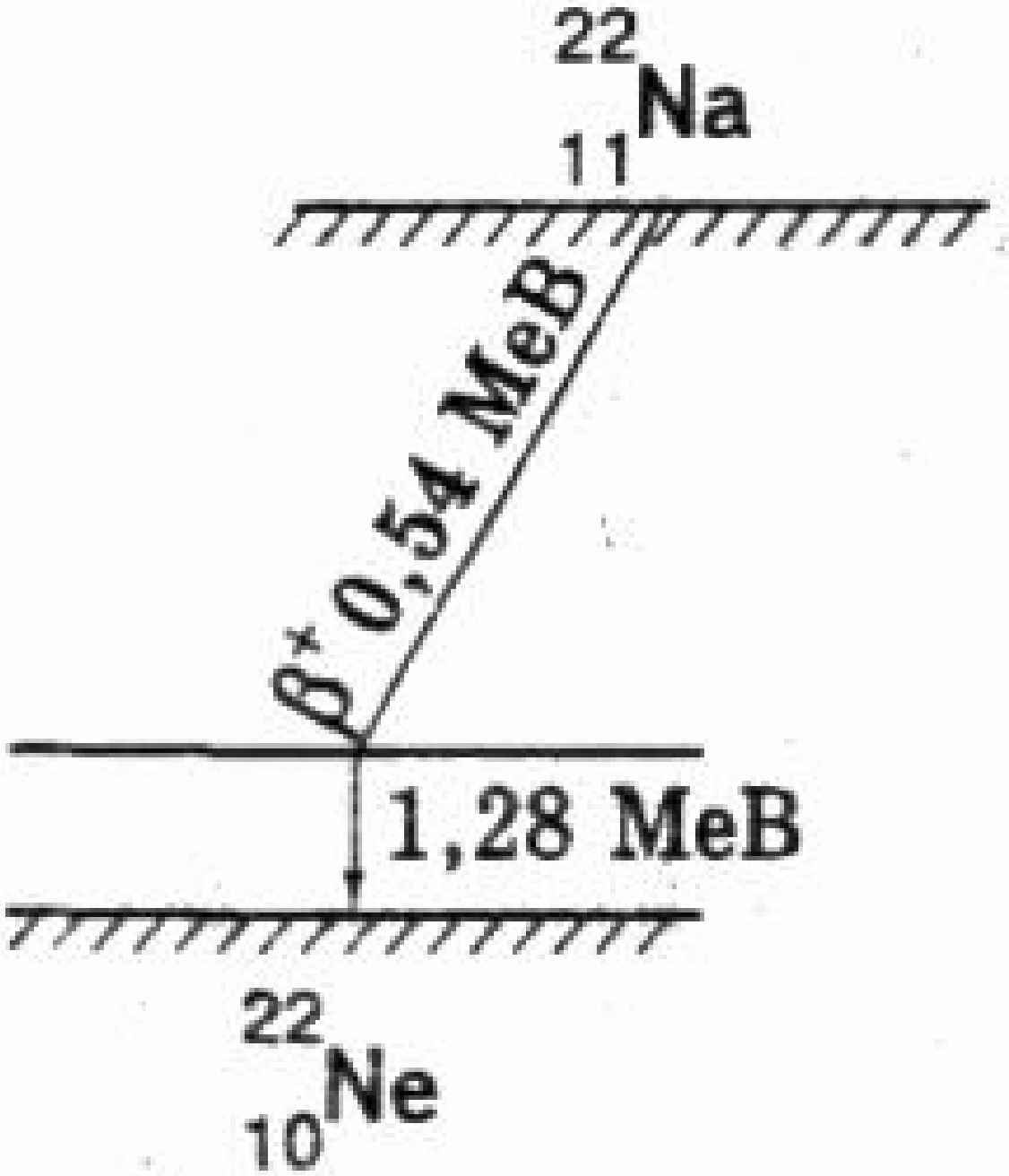
Мал. 2.222



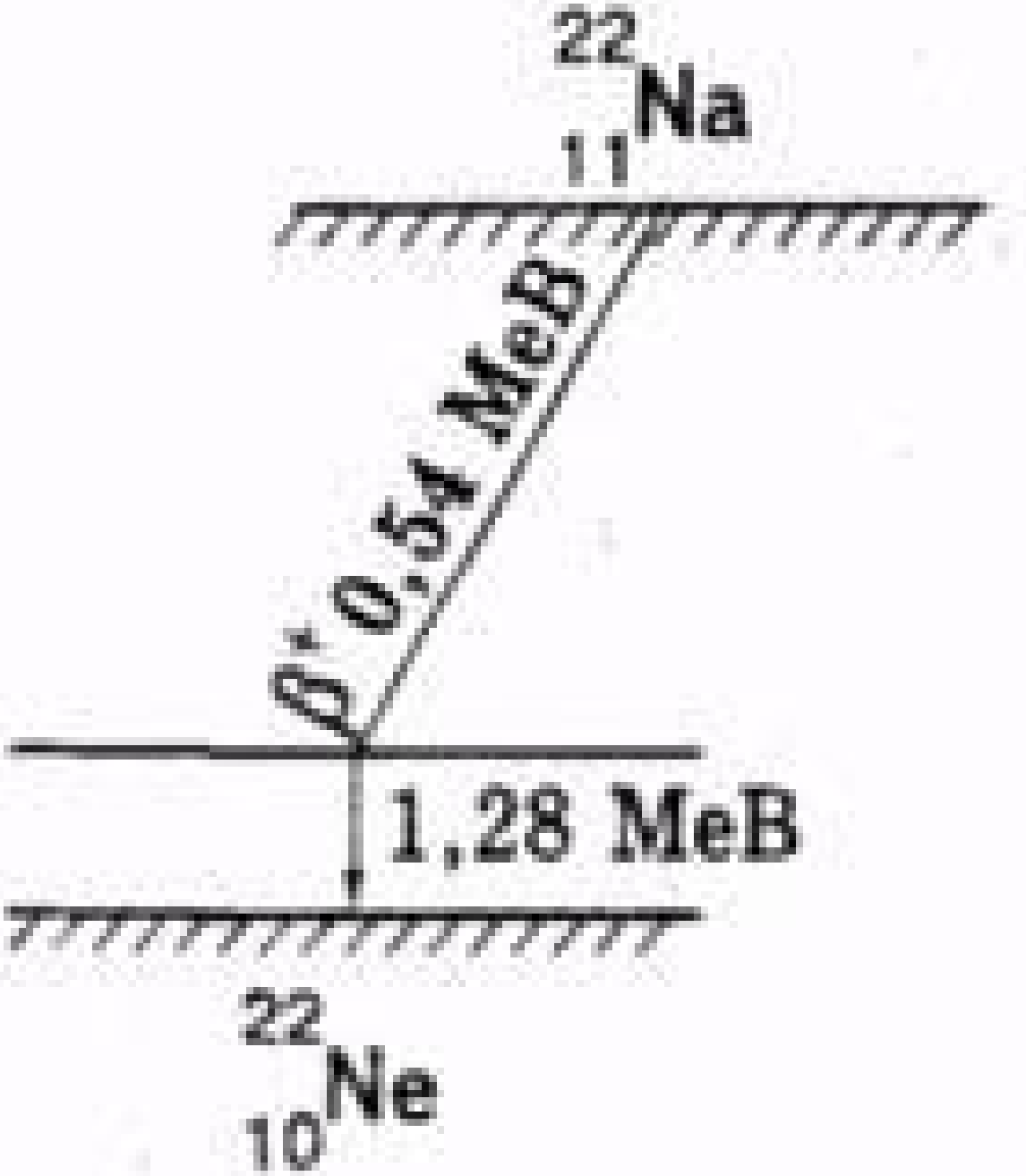


$$p \rightarrow n + e^{+} + \nu \qquad (61.2).$$

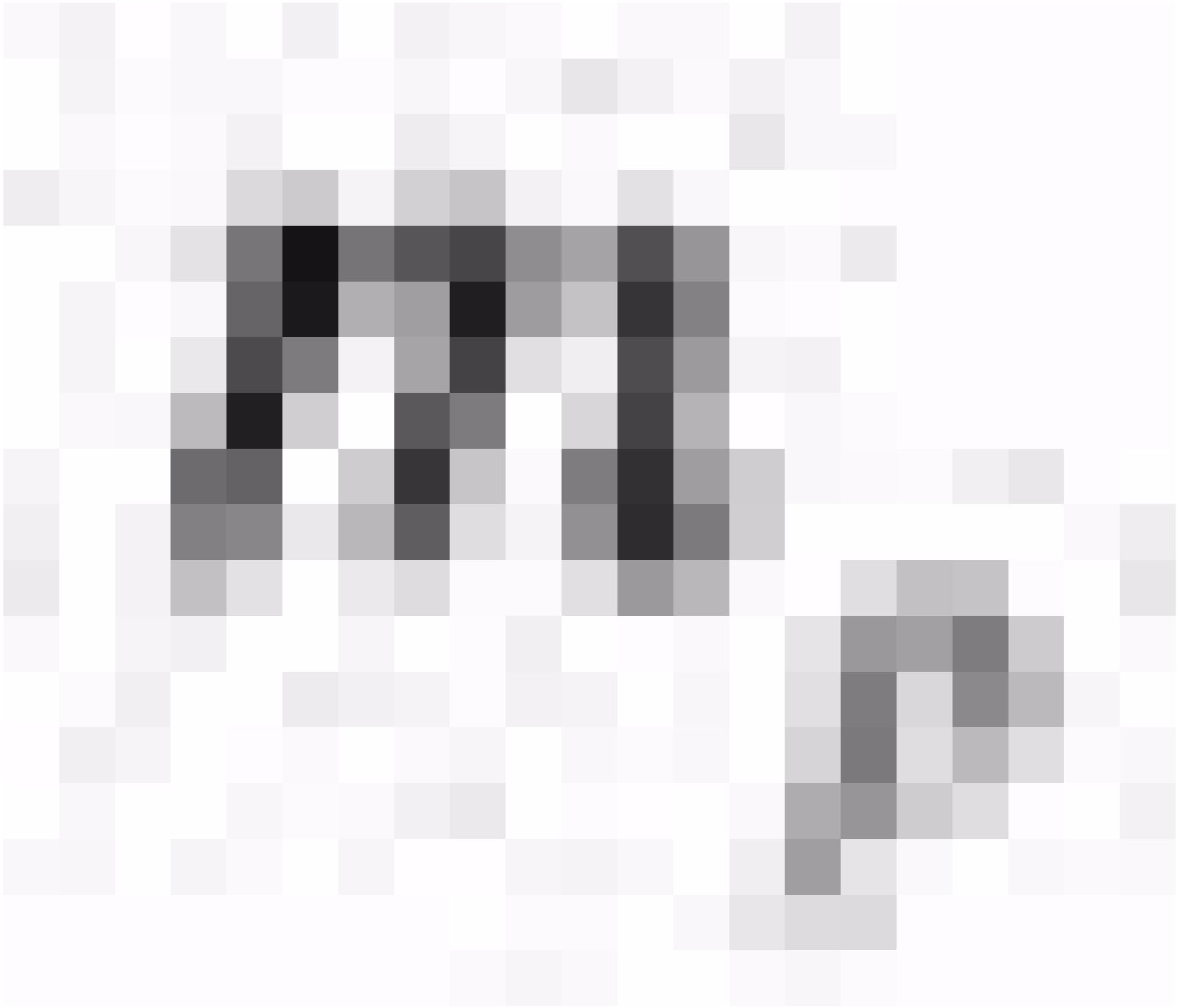
$$p \rightarrow n + e^{+} + \nu \qquad (61.2).$$



Мал. 2.223

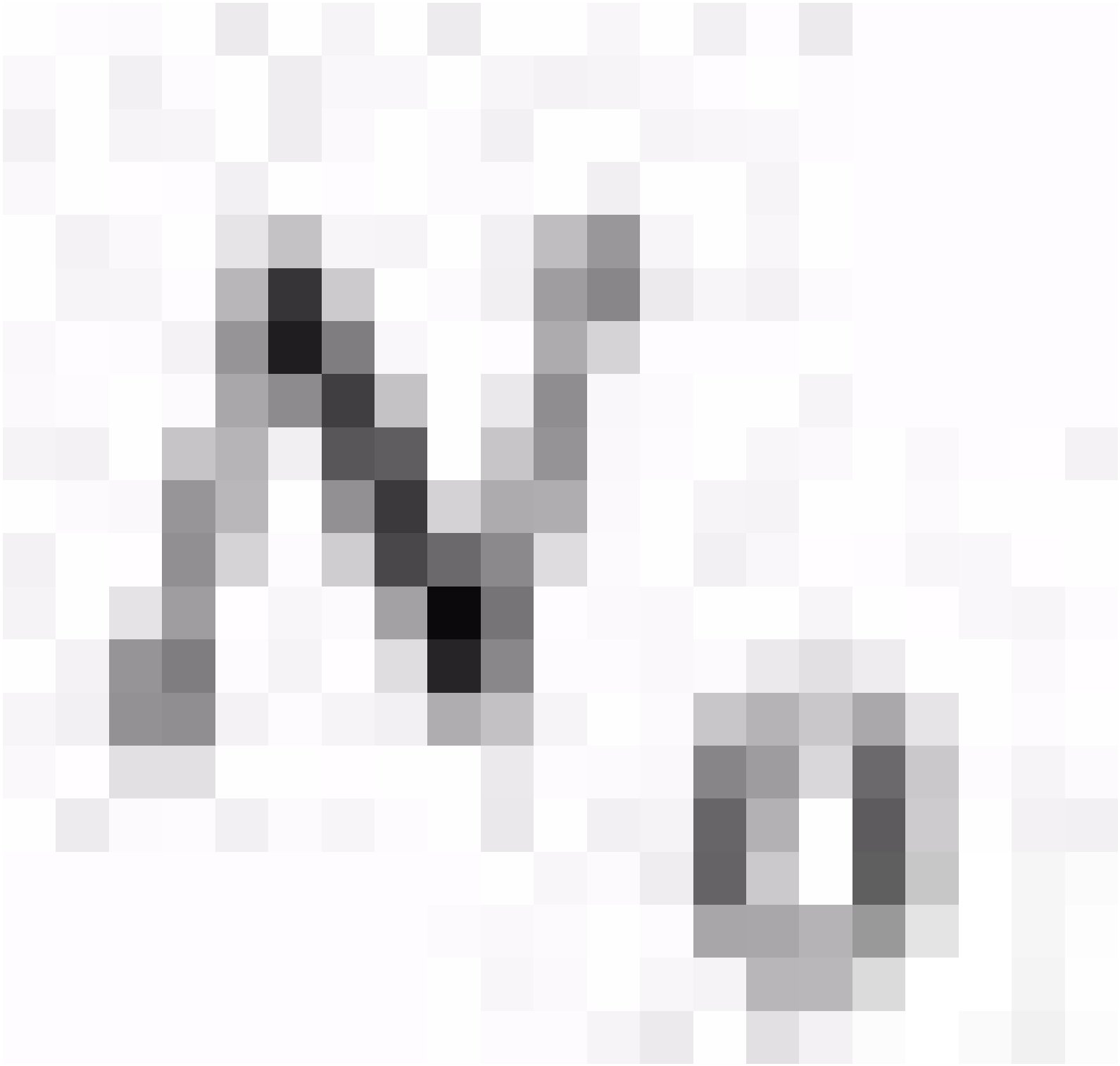


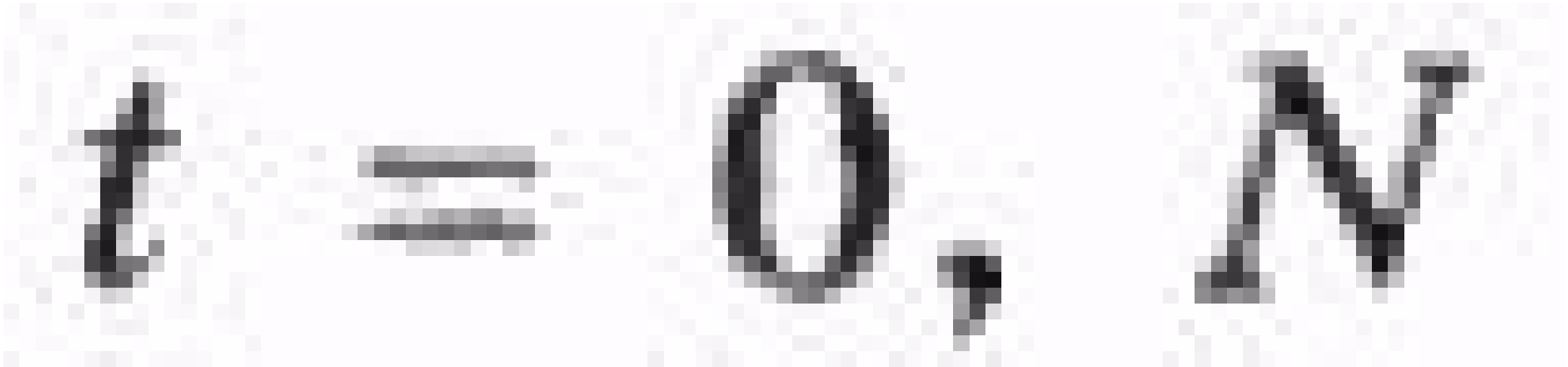
Мал. 2.223

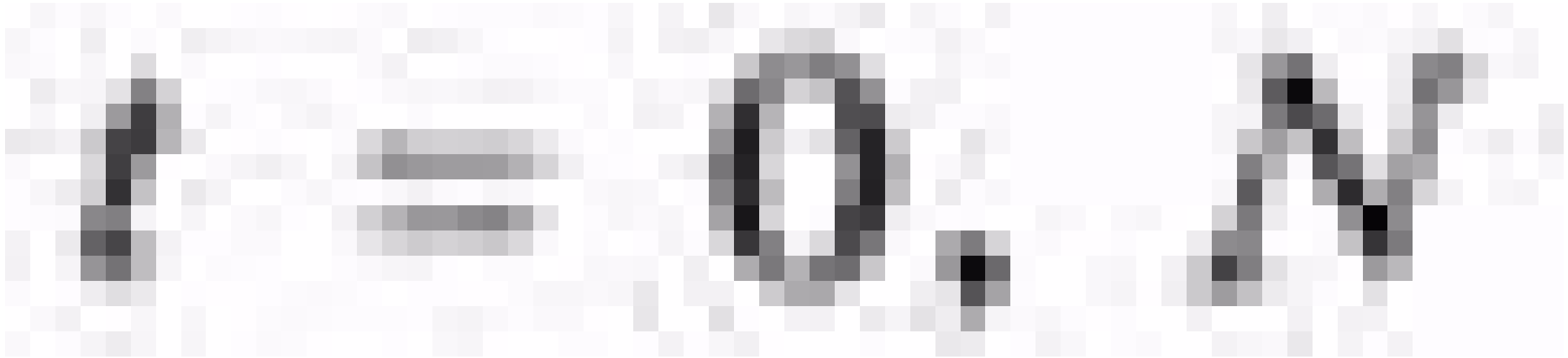


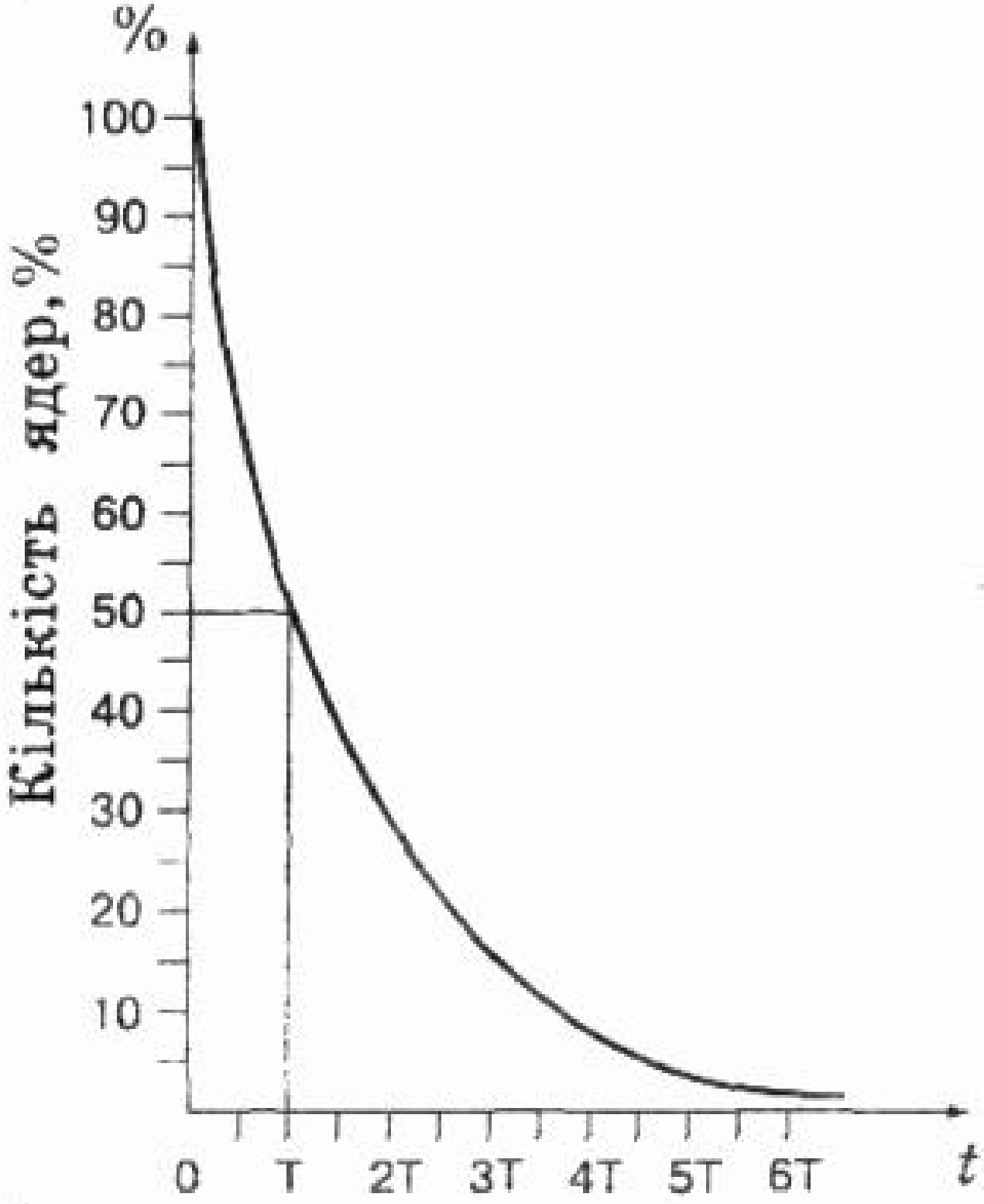
$$N = N_0 2^{-\frac{t}{T}} \qquad (61.3),$$

$$N = N_0 2^{-\frac{t}{T}} \qquad (61.3).$$

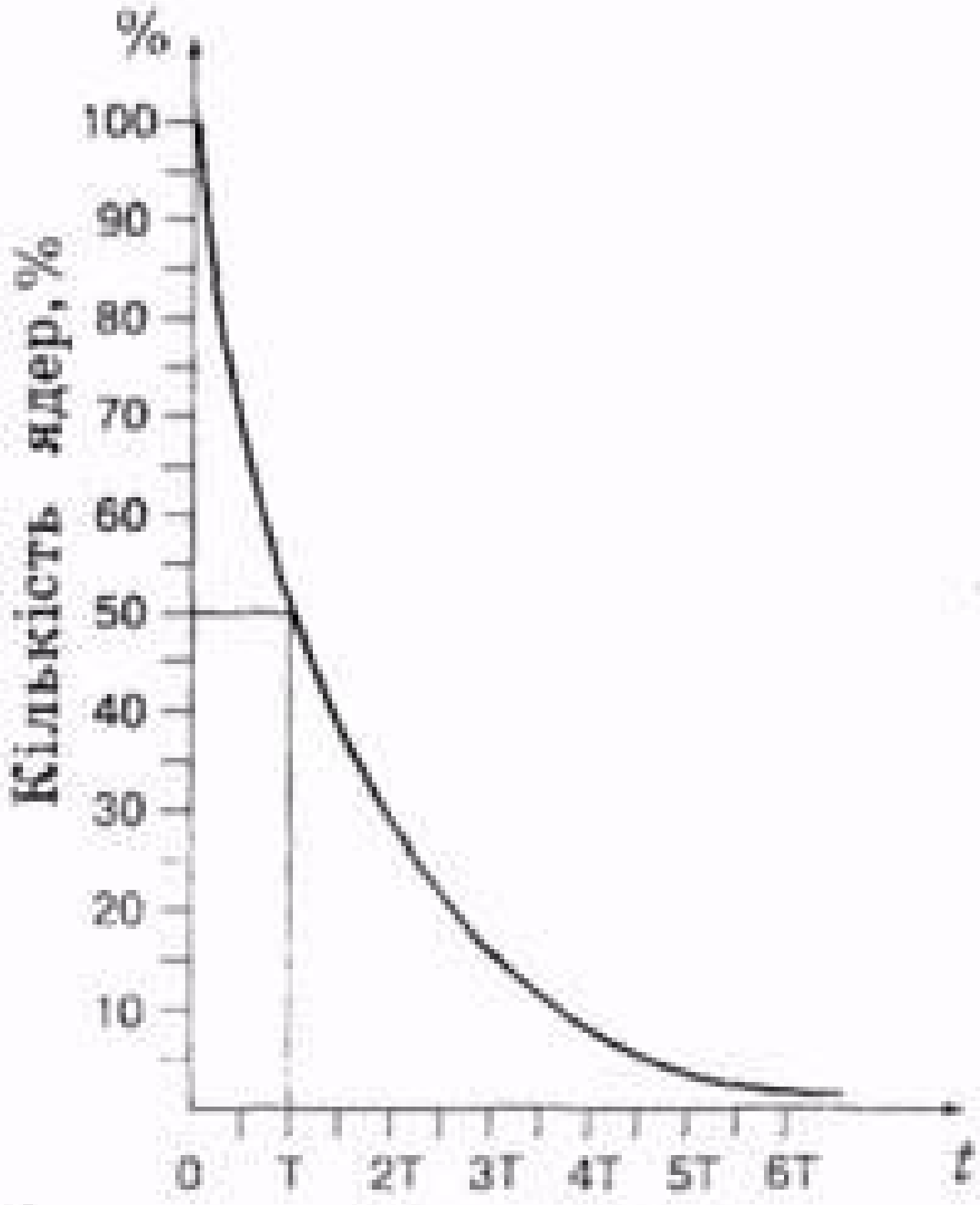




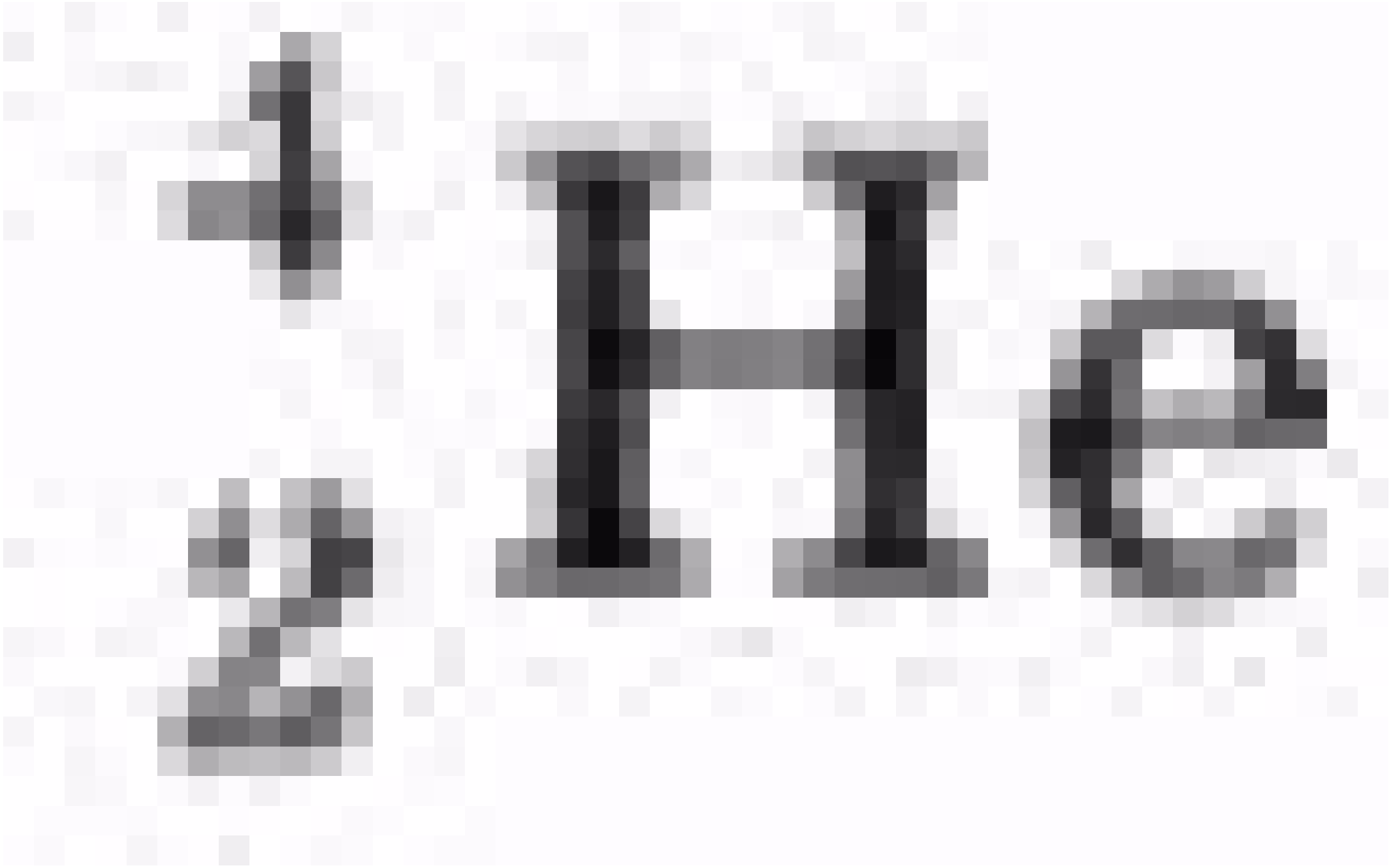


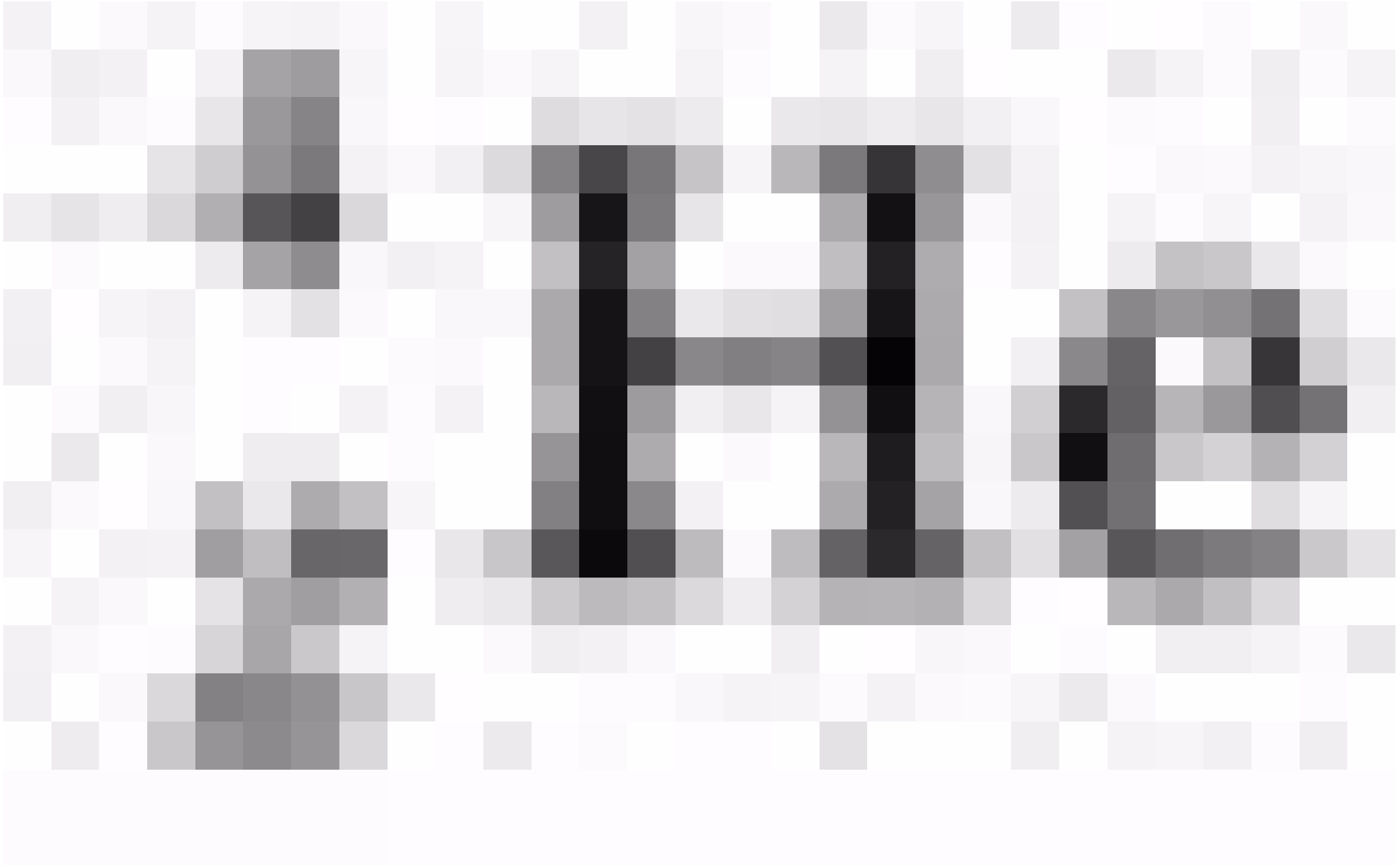


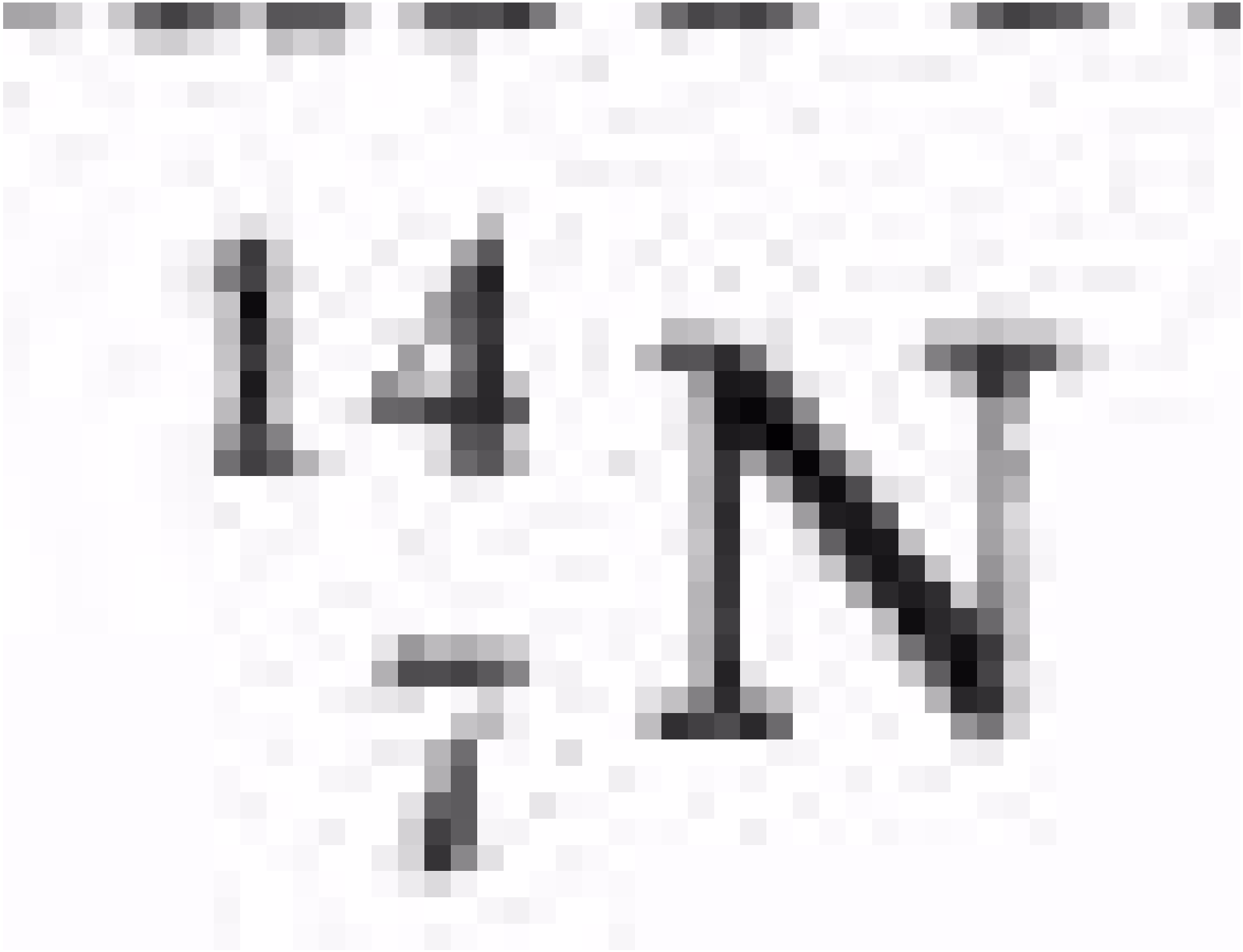
Мал. 2.224

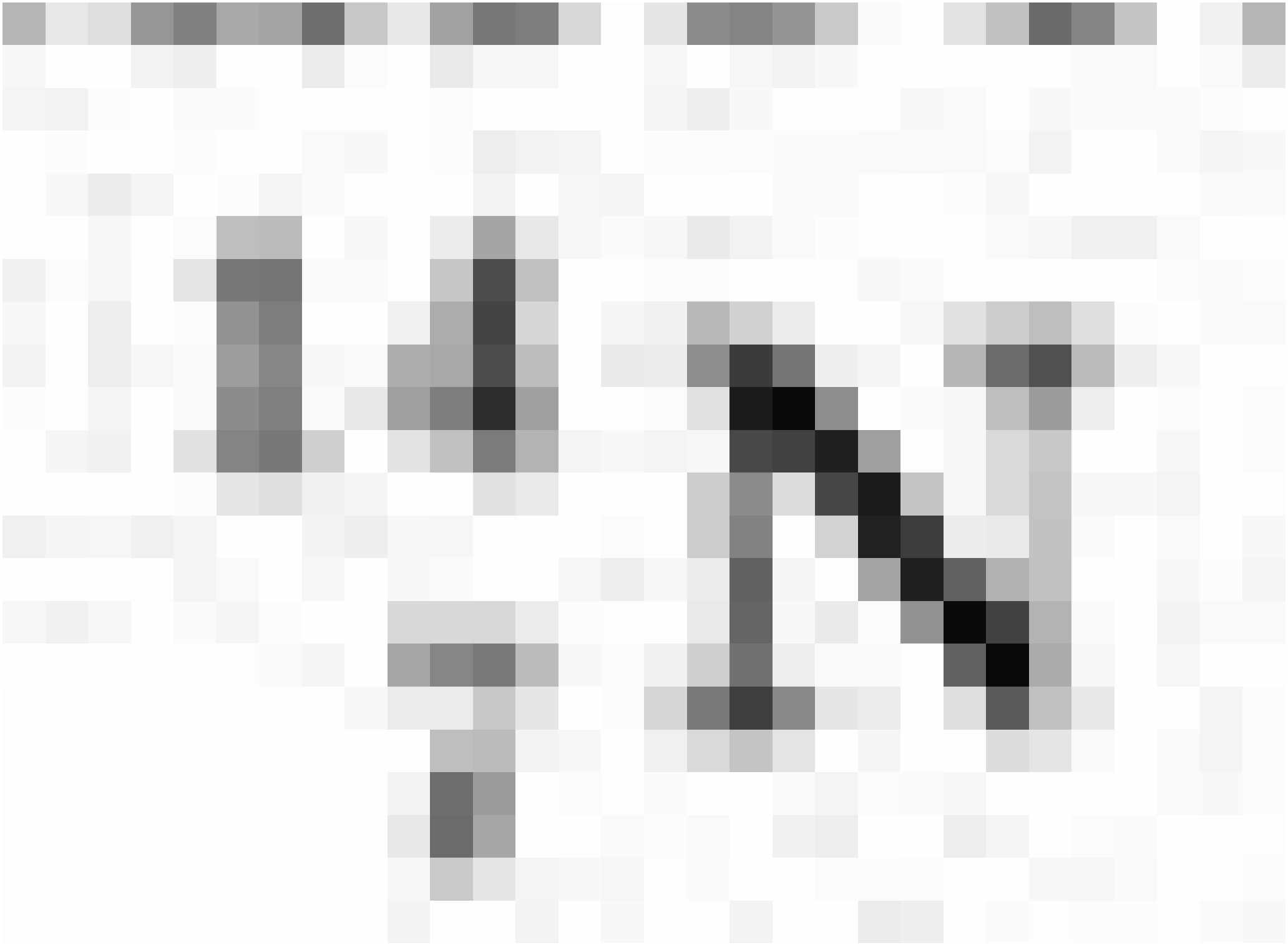


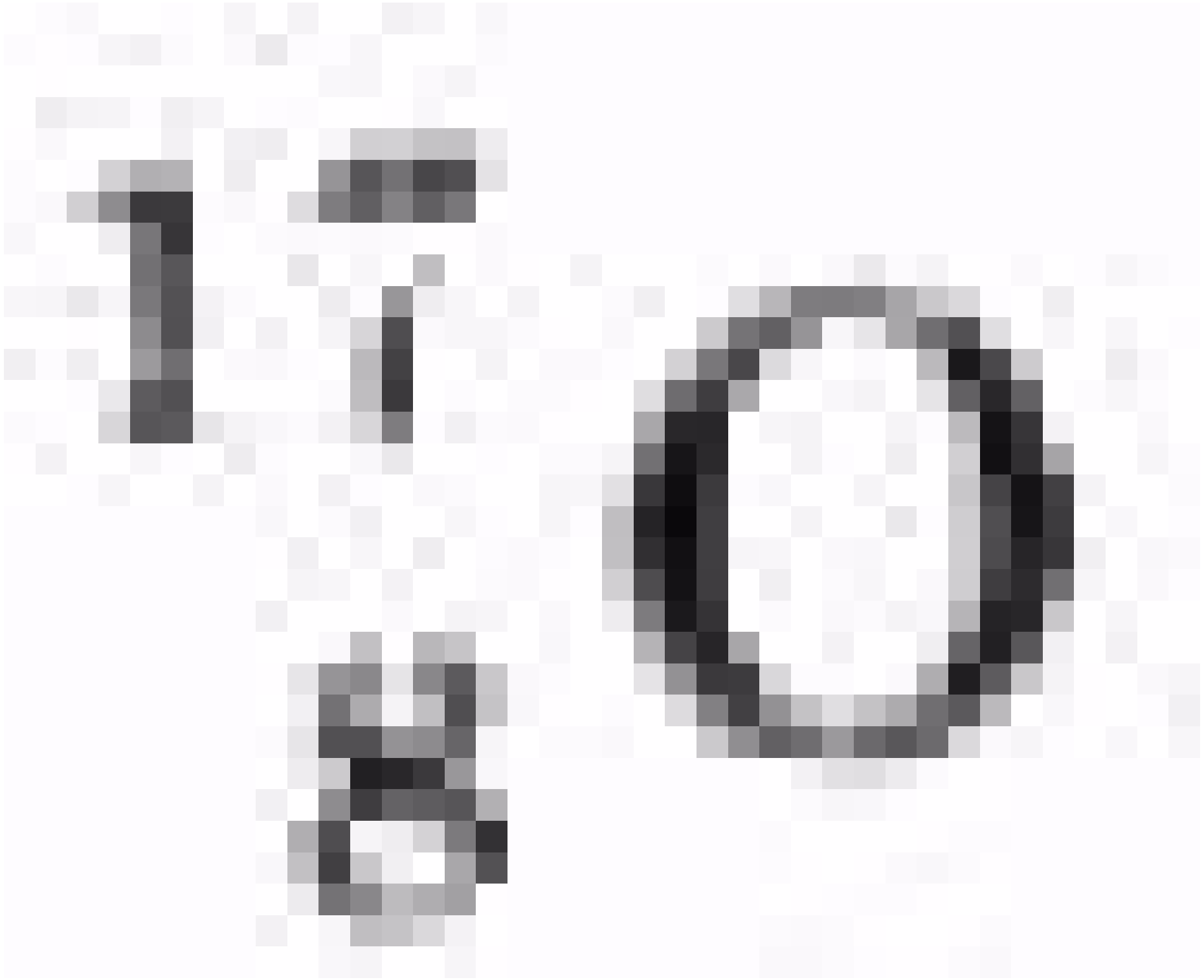
Мал. 2.224

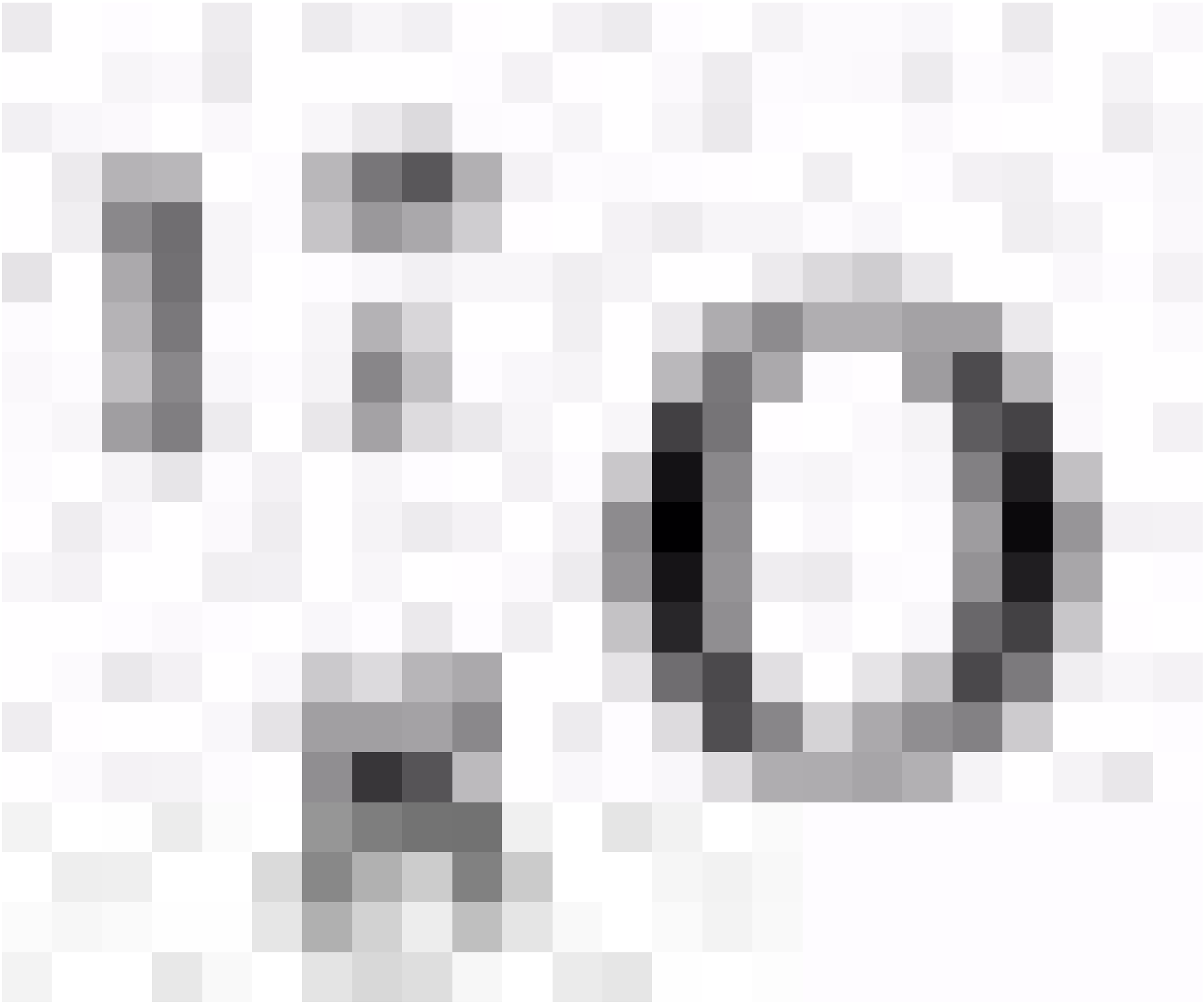


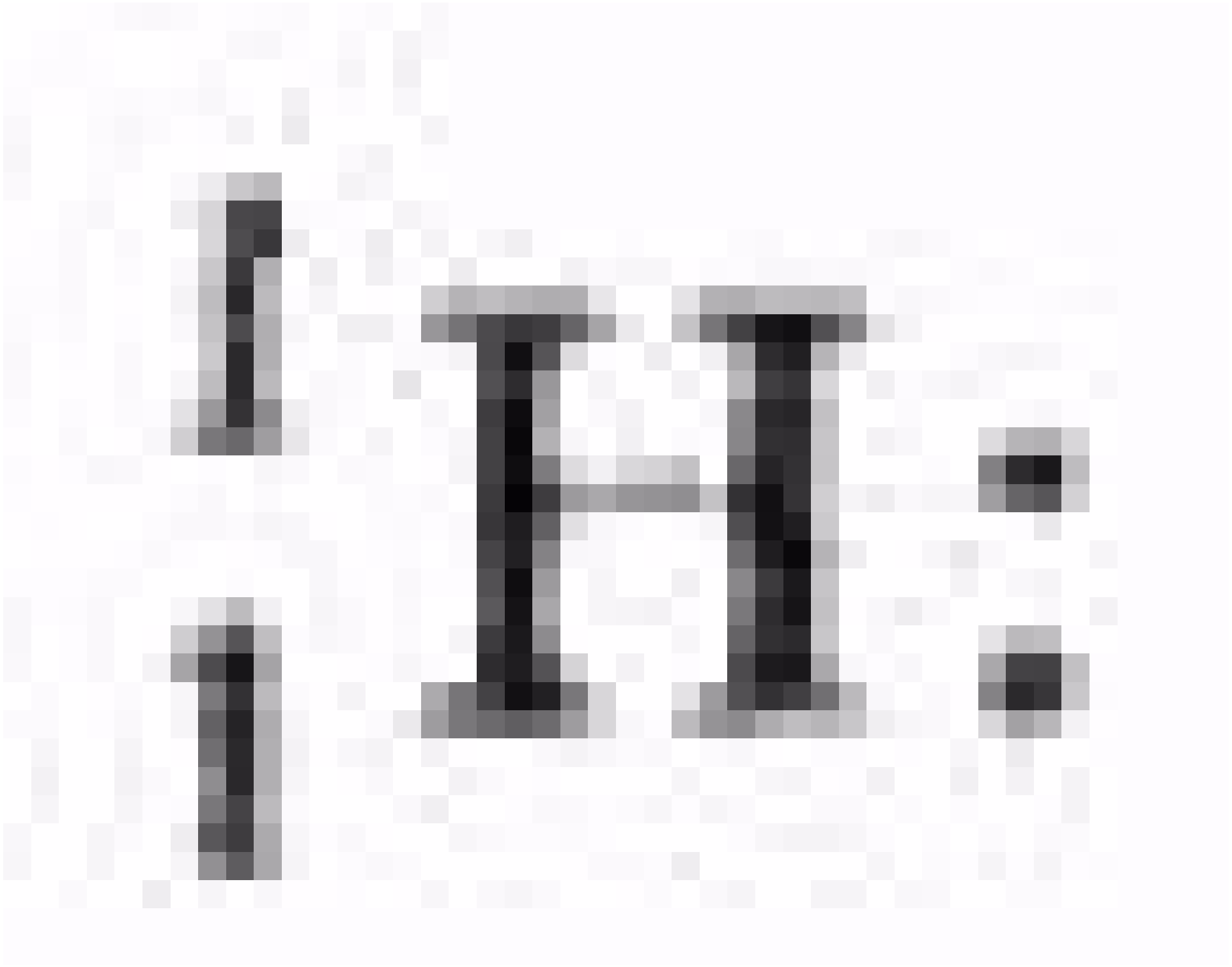


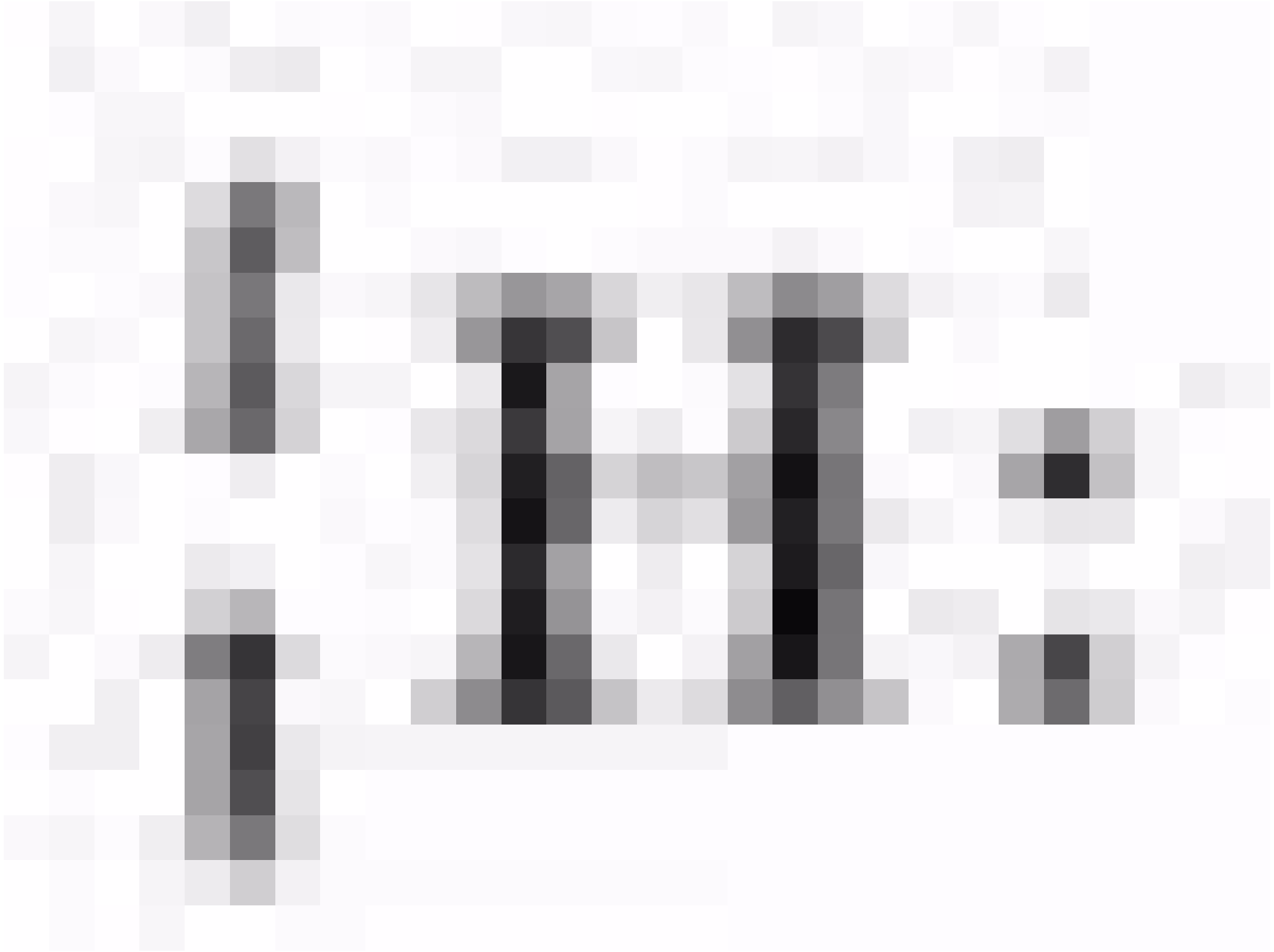






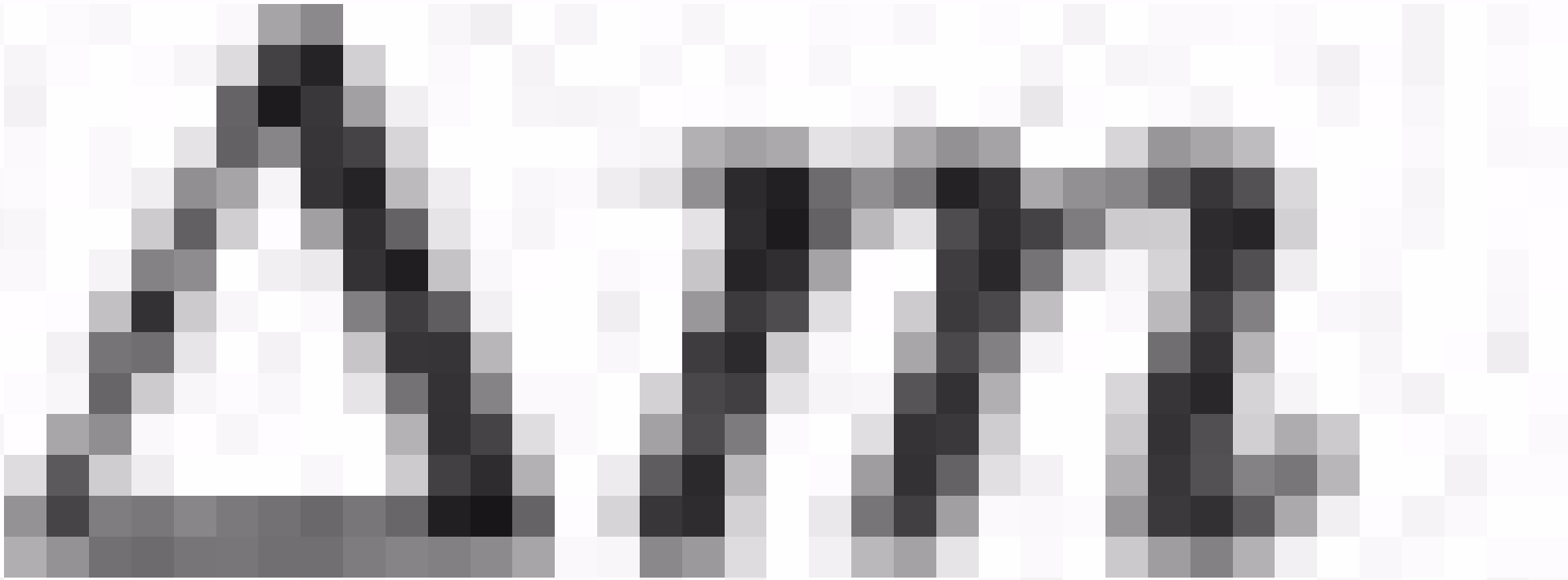






$$^{14}_{7}\mathrm{N} + {}^{4}_{2}\mathrm{He} \rightarrow {}^{17}_{8}\mathrm{O} + {}^{1}_{1}\mathrm{H} \qquad (62.1).$$

$$^{14}_{7}\mathrm{N} + ^{4}_{2}\mathrm{He} \rightarrow ^{17}_{8}\mathrm{O} + ^{1}_{1}\mathrm{H} \qquad (62.1).$$

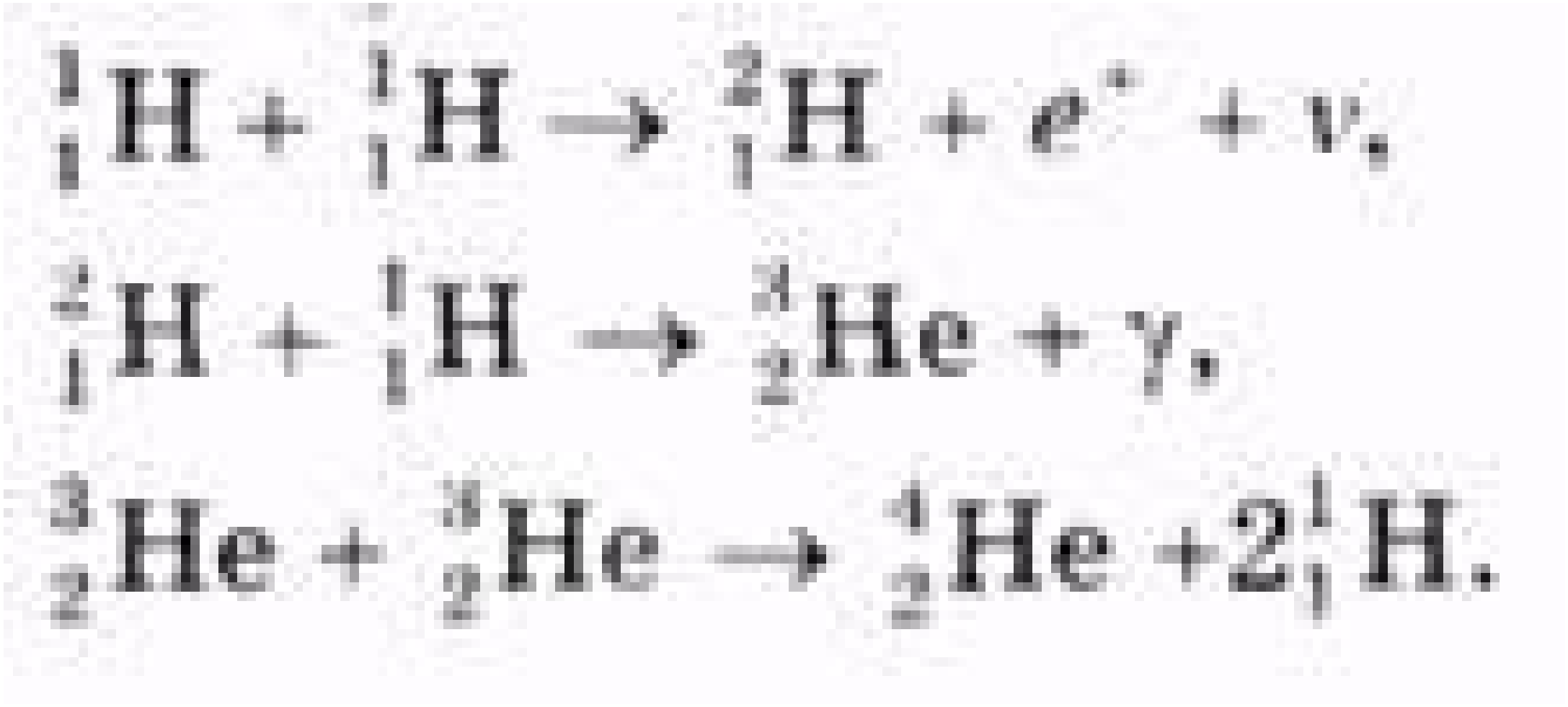


$$\Delta E = \Delta m c^2.$$

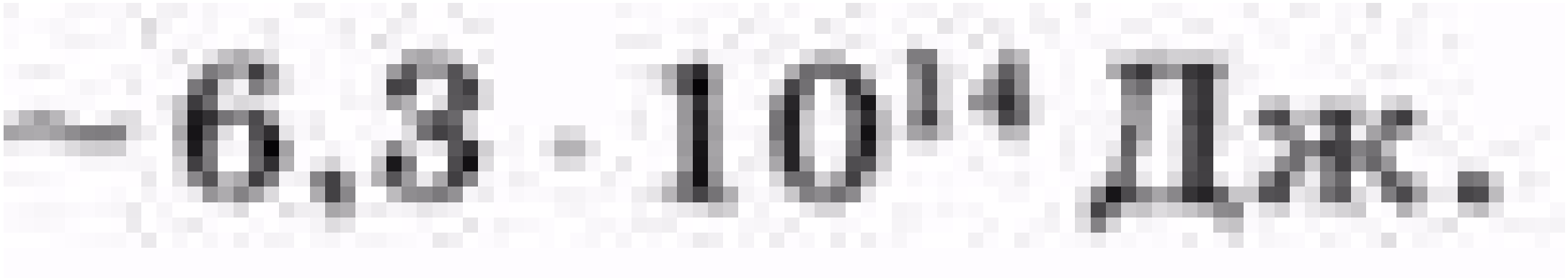
$$ {}^{1}_{1}\mathrm{H} + {}^{1}_{1}\mathrm{H} \rightarrow {}^{2}_{1}\mathrm{H} + e^{+} + \nu, $$

$$ {}^{2}_{1}\mathrm{H} + {}^{1}_{1}\mathrm{H} \rightarrow {}^{3}_{2}\mathrm{He} + \gamma, $$

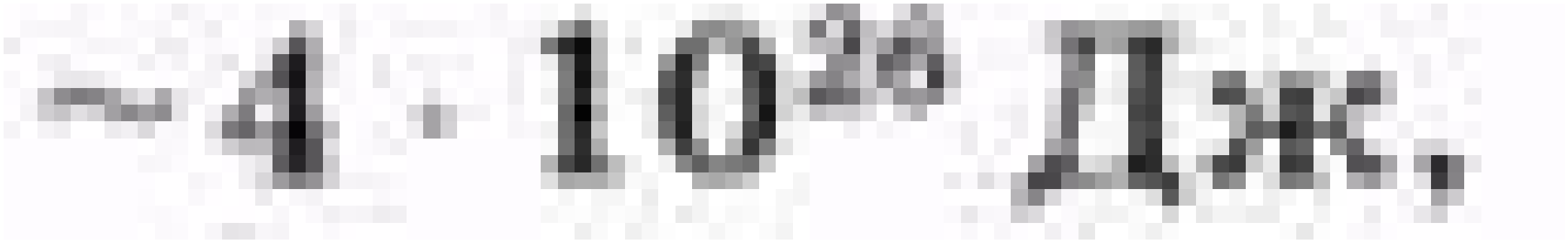
$$ {}^{3}_{2}\mathrm{He} + {}^{3}_{2}\mathrm{He} \rightarrow {}^{4}_{2}\mathrm{He} + 2{}^{1}_{1}\mathrm{H}. $$


$_{1}^{1}\mathrm{H} + {}_{1}^{1}\mathrm{H} \rightarrow {}_{1}^{2}\mathrm{H} + e^{+} + \nu,$
$_{1}^{2}\mathrm{H} + {}_{1}^{1}\mathrm{H} \rightarrow {}_{2}^{3}\mathrm{He} + \gamma,$
$_{2}^{3}\mathrm{He} + {}_{2}^{3}\mathrm{He} \rightarrow {}_{2}^{4}\mathrm{He} + 2{}_{1}^{1}\mathrm{H}.$

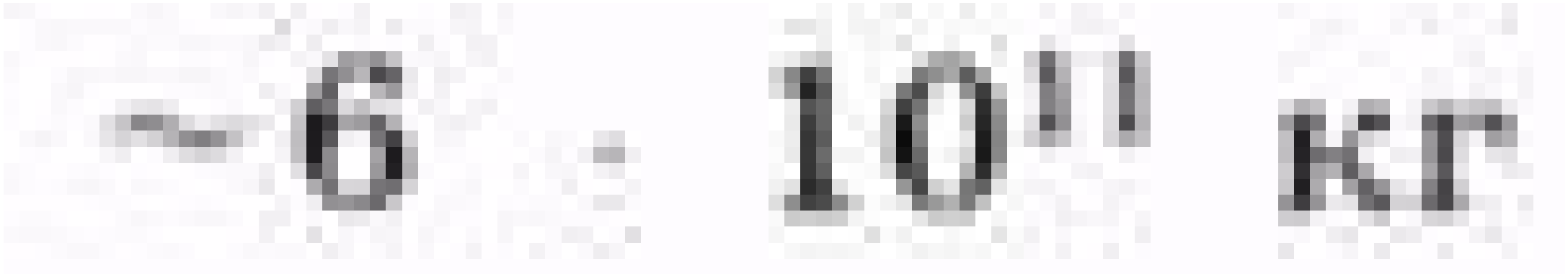
$$\sim 6{,}3 \cdot 10^{14}\ \text{Дж}.$$

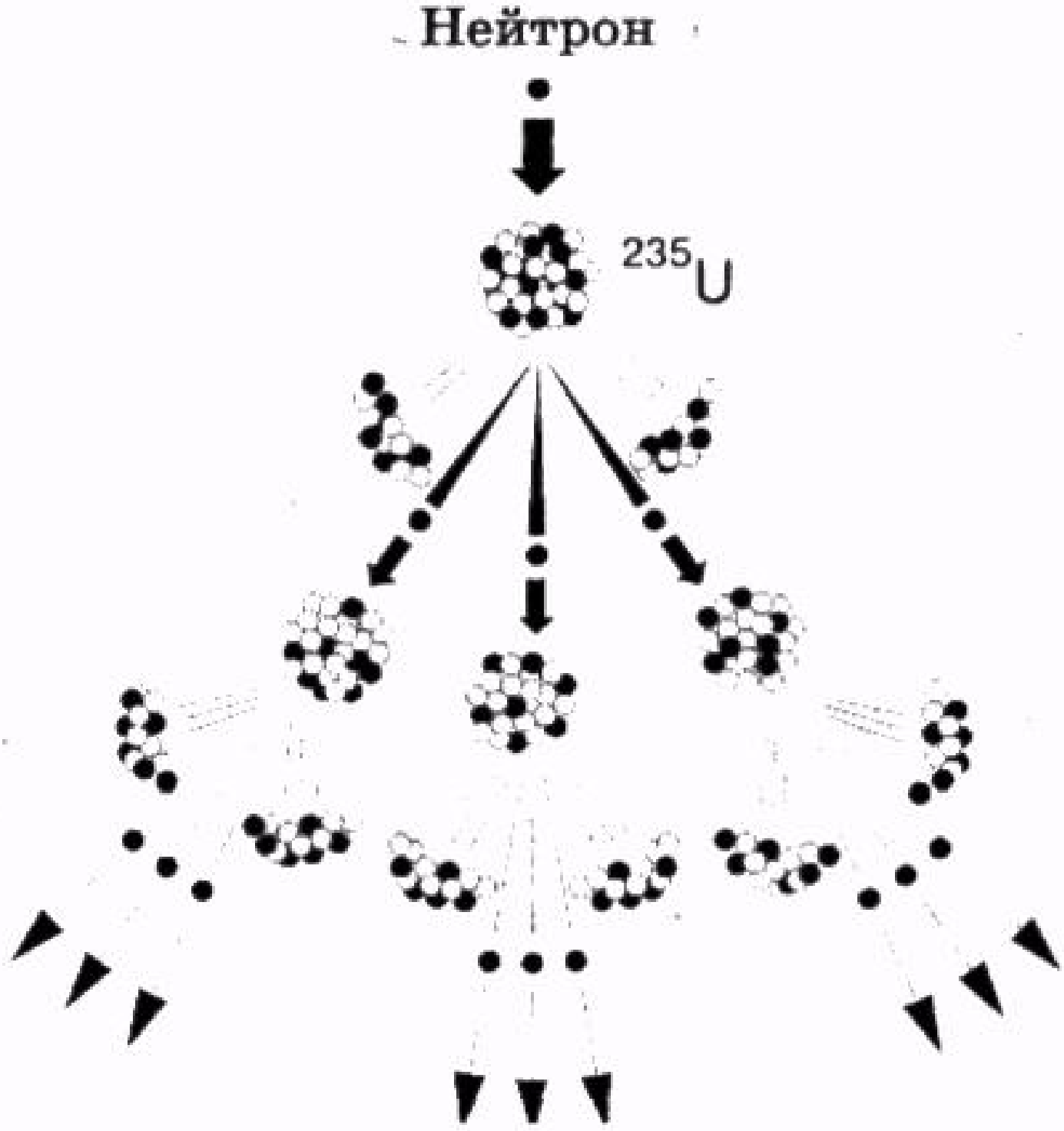


$\sim 4 \cdot 10^{26}$ Дж,

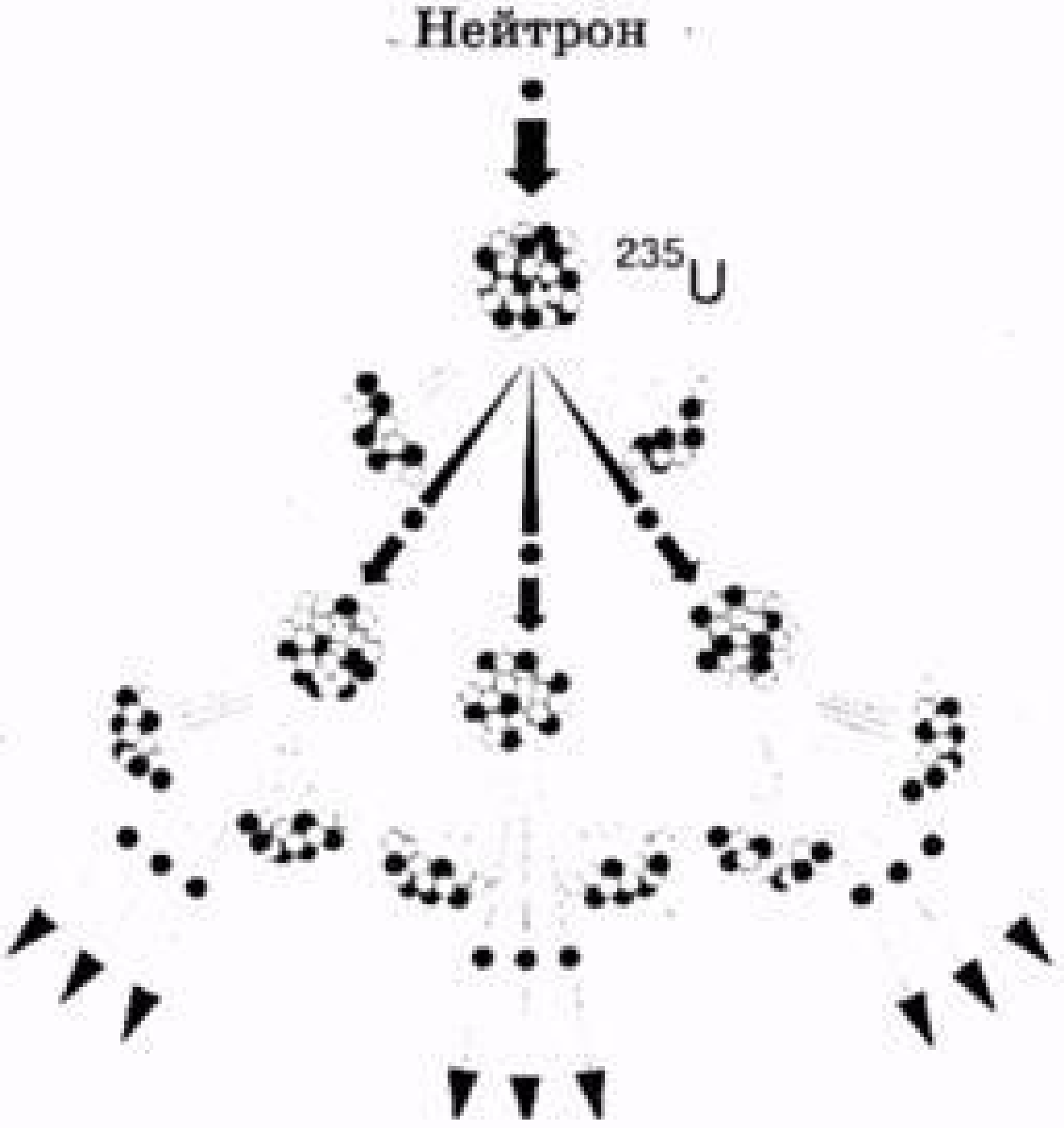


$\sim 6 \cdot 10^{11}$ кг


-6%
10 kr

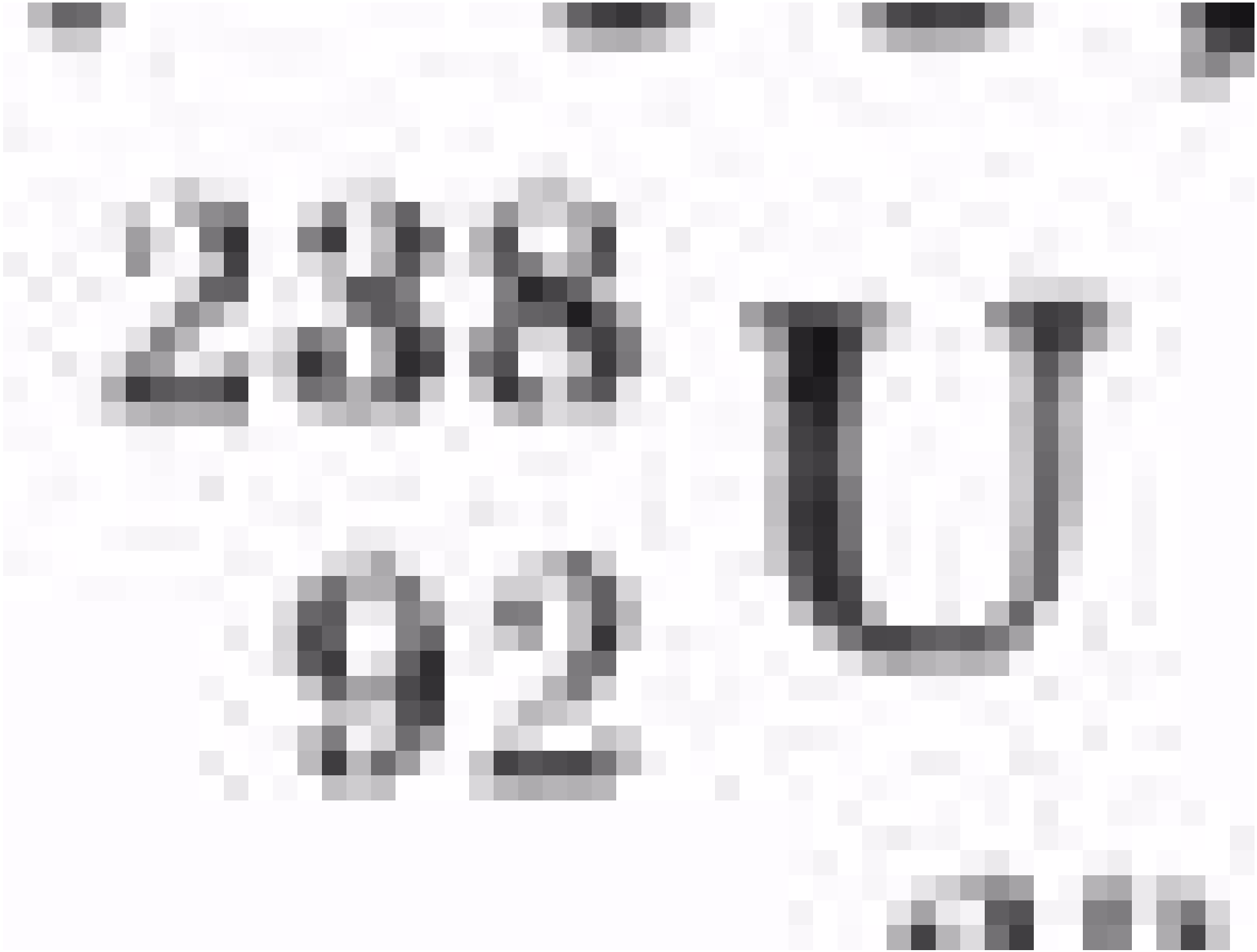


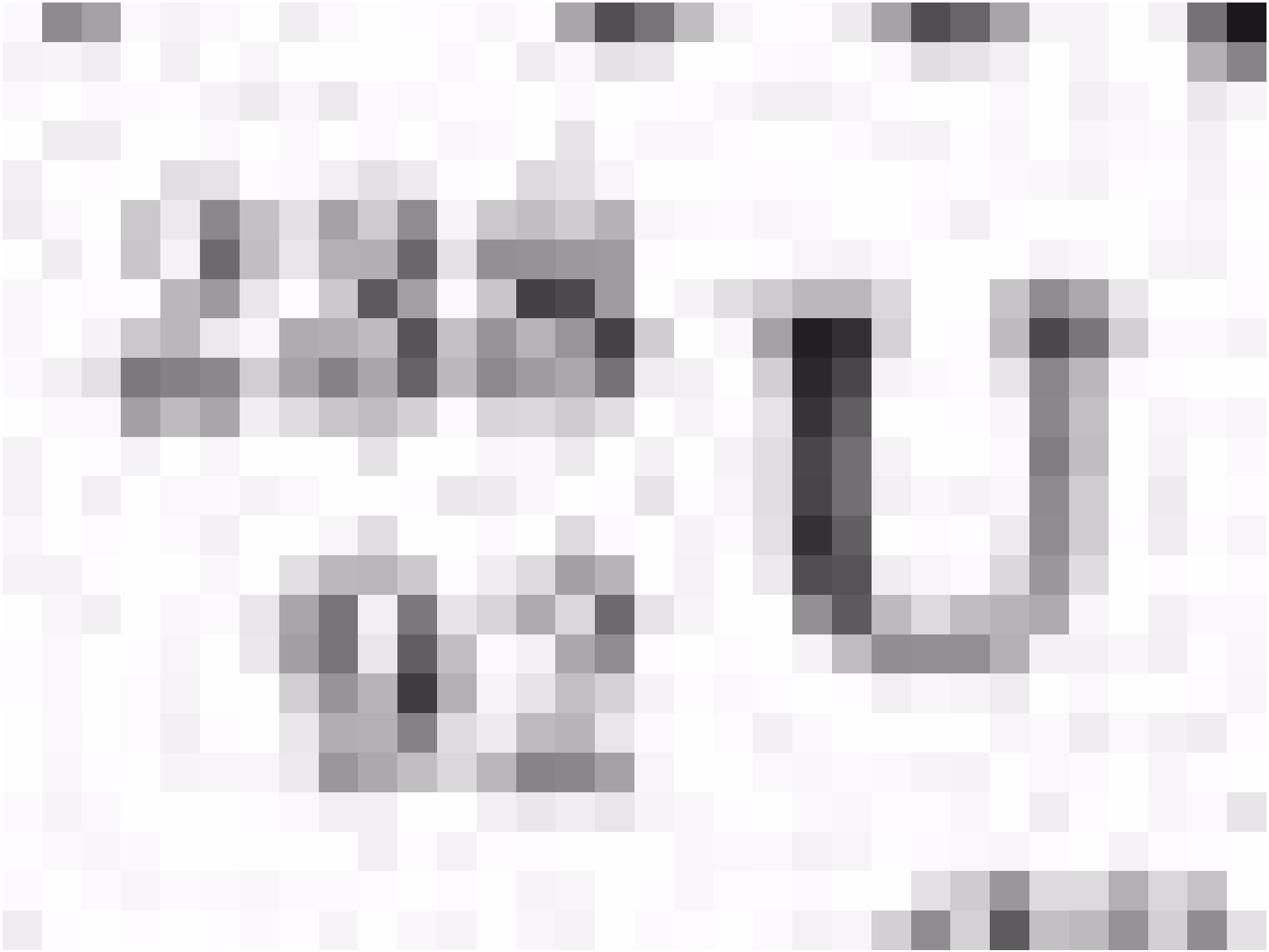
Мал. 2.225

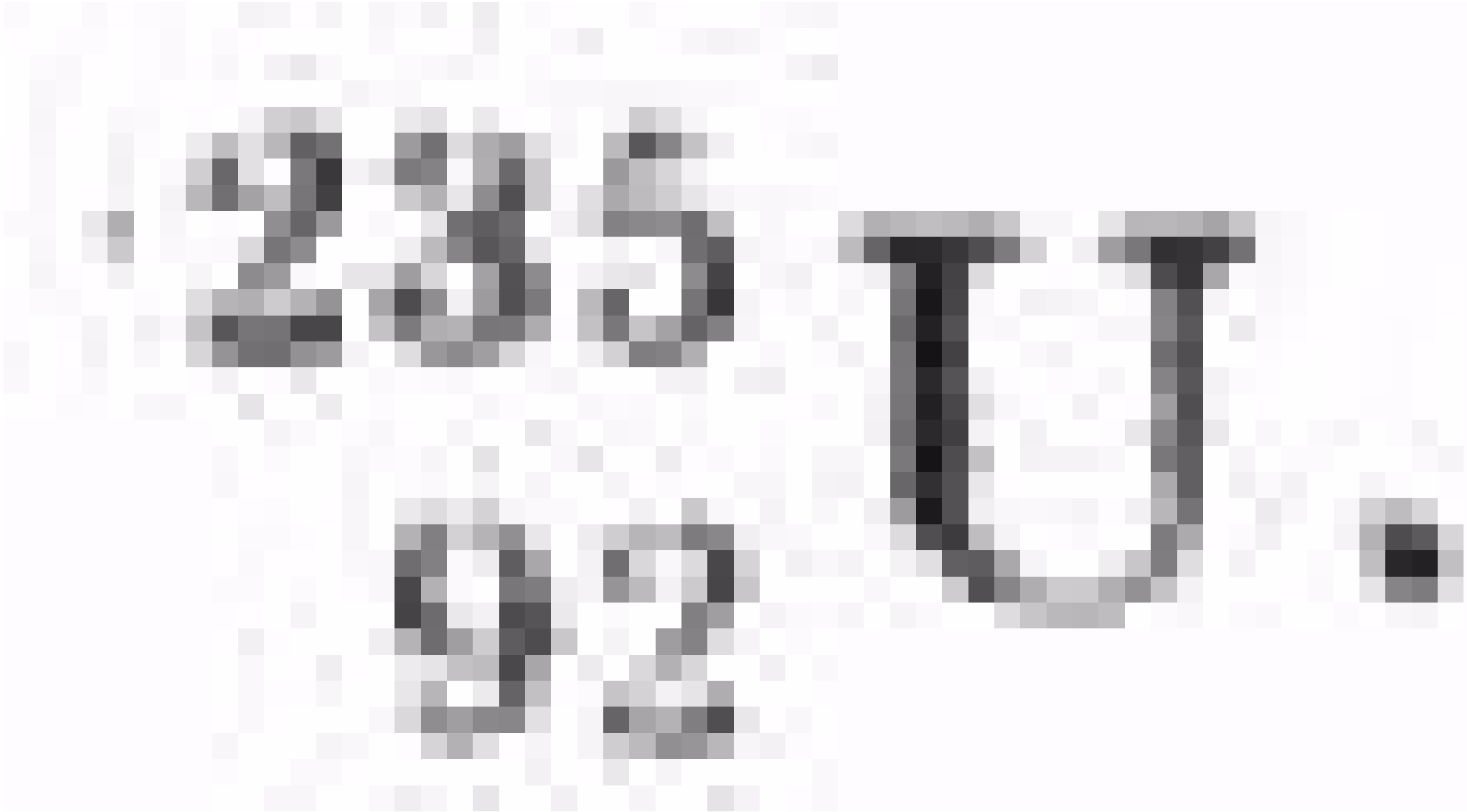


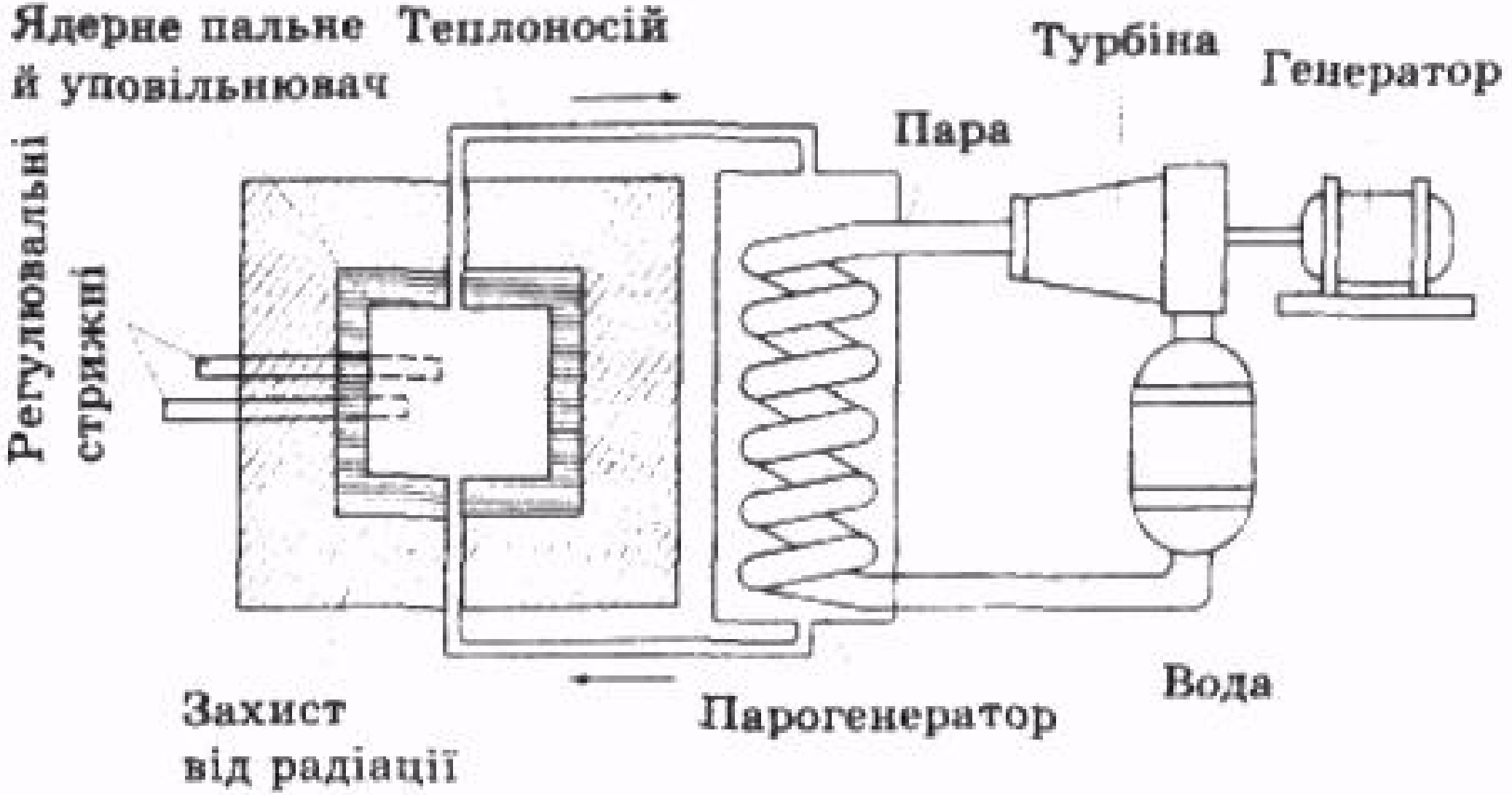
Мал. 2.225

$8 \cdot 10^{13}$ Дж.

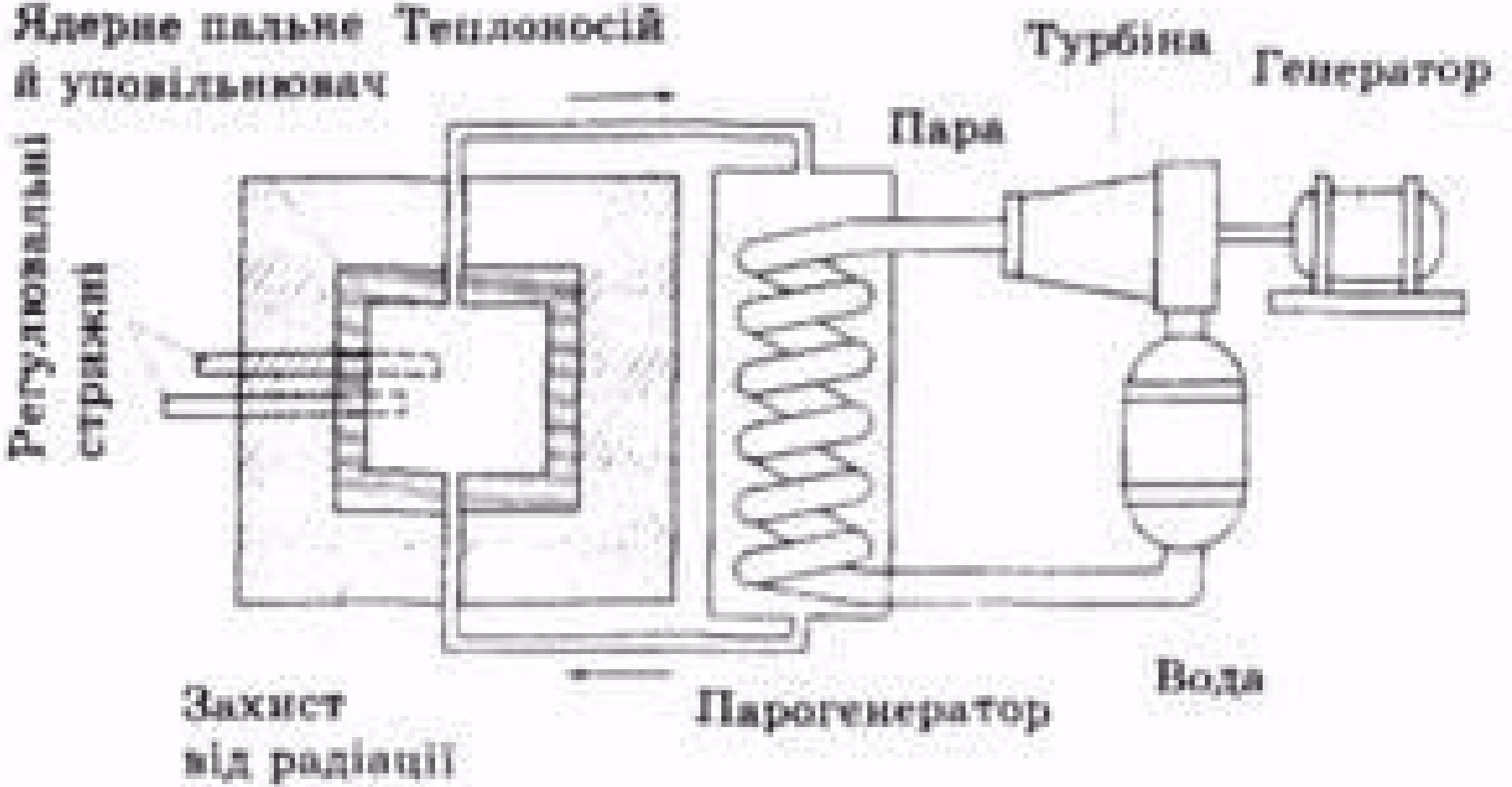







Ядерне пальне
й уповільнювач
Теплоносій
Турбіна
Генератор
Пара
Регулювальні
стрижні
Захист
від радіації
Парогенератор
Вода

Мал. 2.226


Ядерне пальне
й уповільнювач
Теплоносій
Турбіна
Генератор
Пара
Регулювальні
стрижні
Захист
від радіації
Парогенератор
Вода

Мал. 2.226

$$D = \frac{E}{m} \qquad (63.1).$$

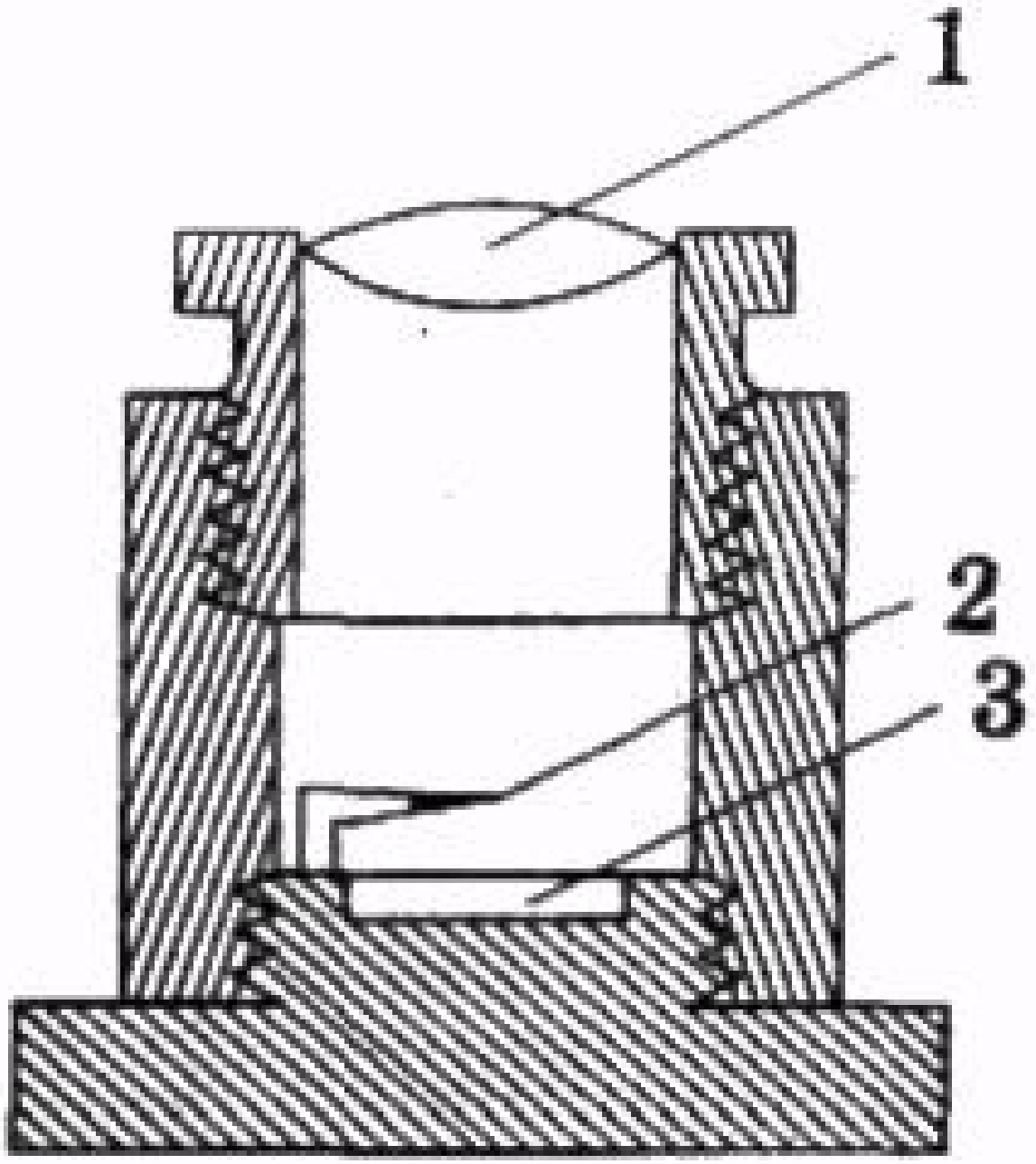
$$D = \frac{E}{m} \qquad (63.1).$$

$$1\,\text{Гр} = \frac{1\,\text{Дж}}{1\,\text{кг}} = 1\,\text{Дж}/\text{кг}.$$

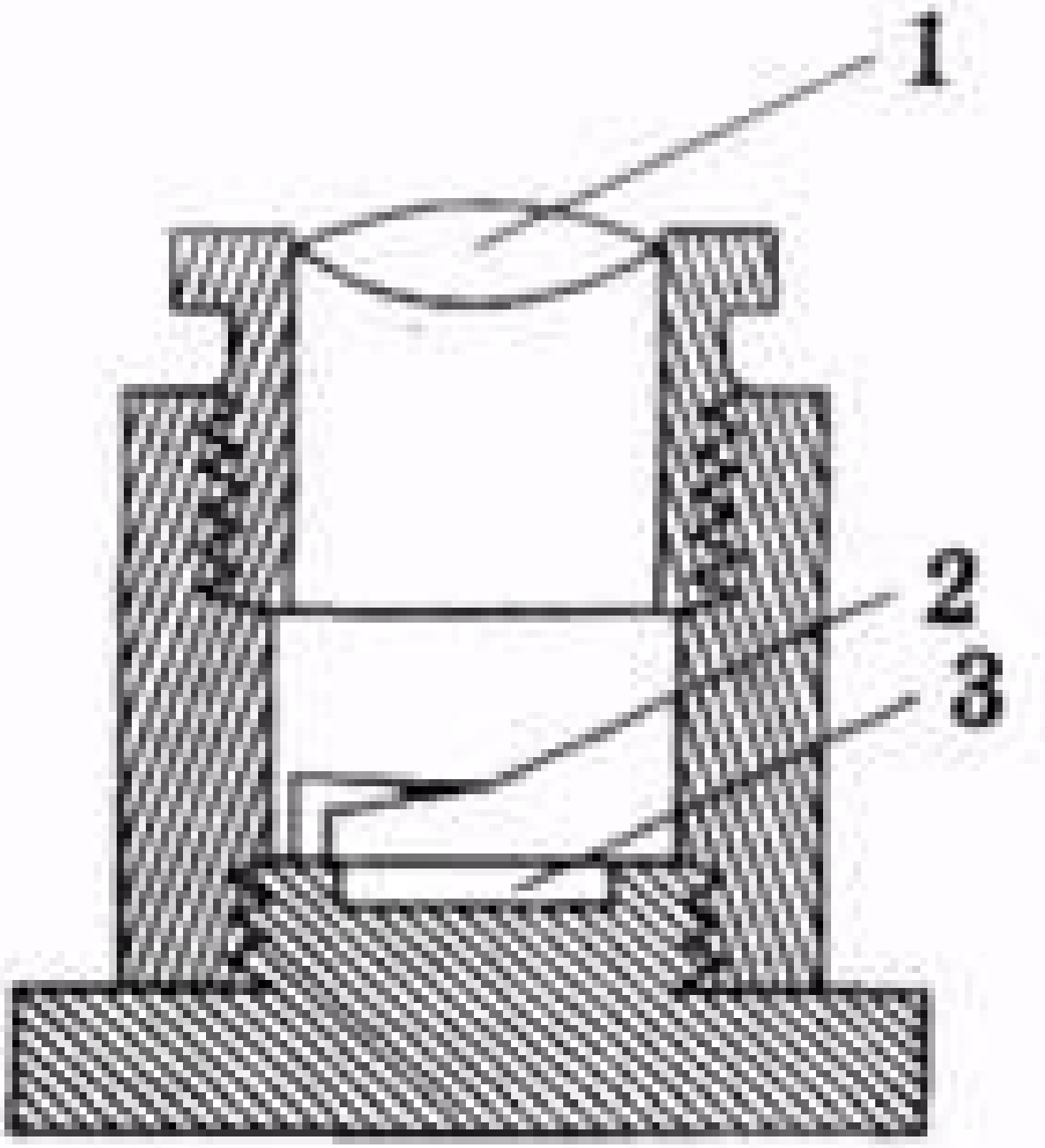

1 Гр = 1 Дж / 1 кг = 1 Дж/кг.

$$H = kD \qquad (63.2).$$

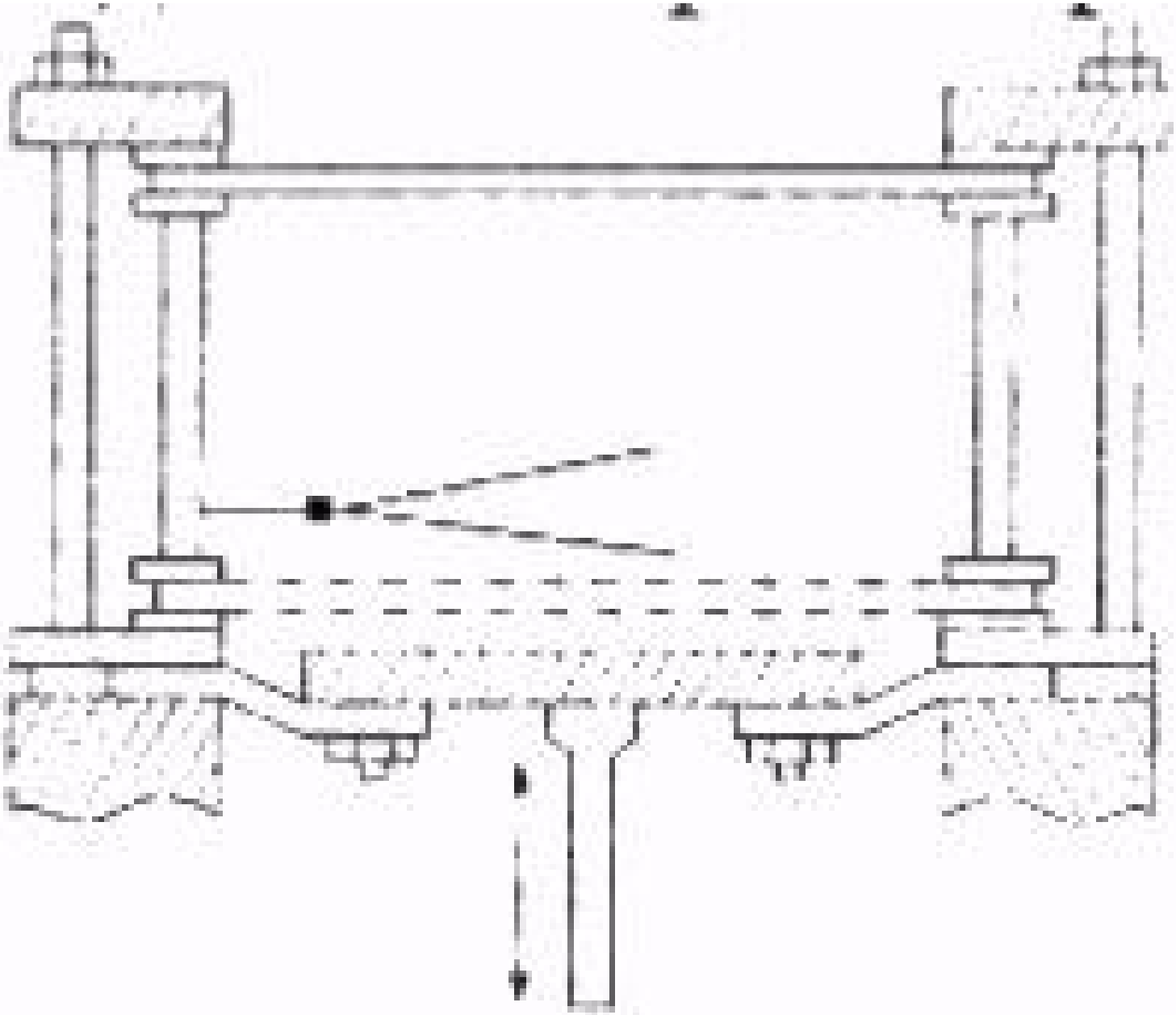
$$H = kD \qquad (63.2).$$



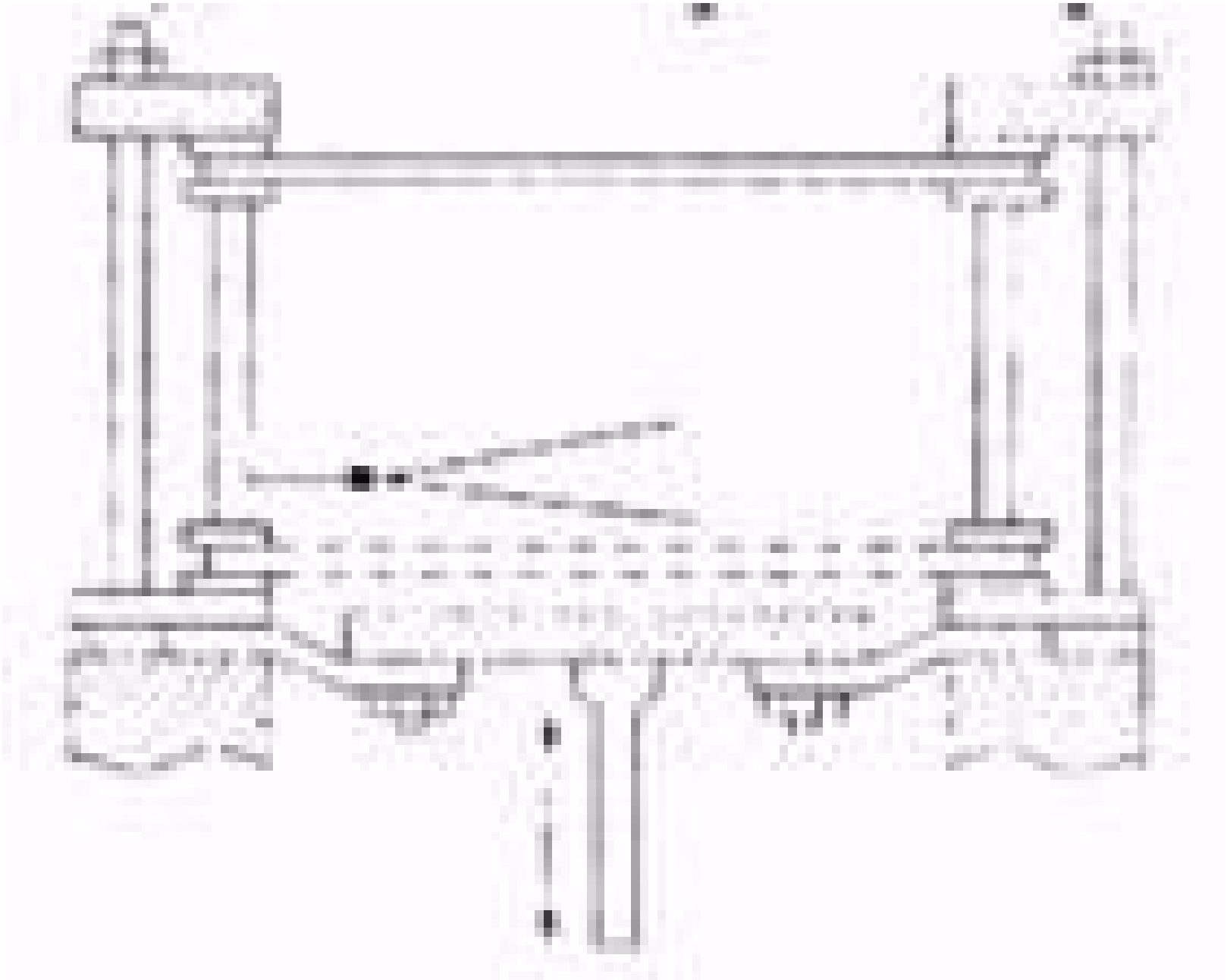
Мал. 2.227



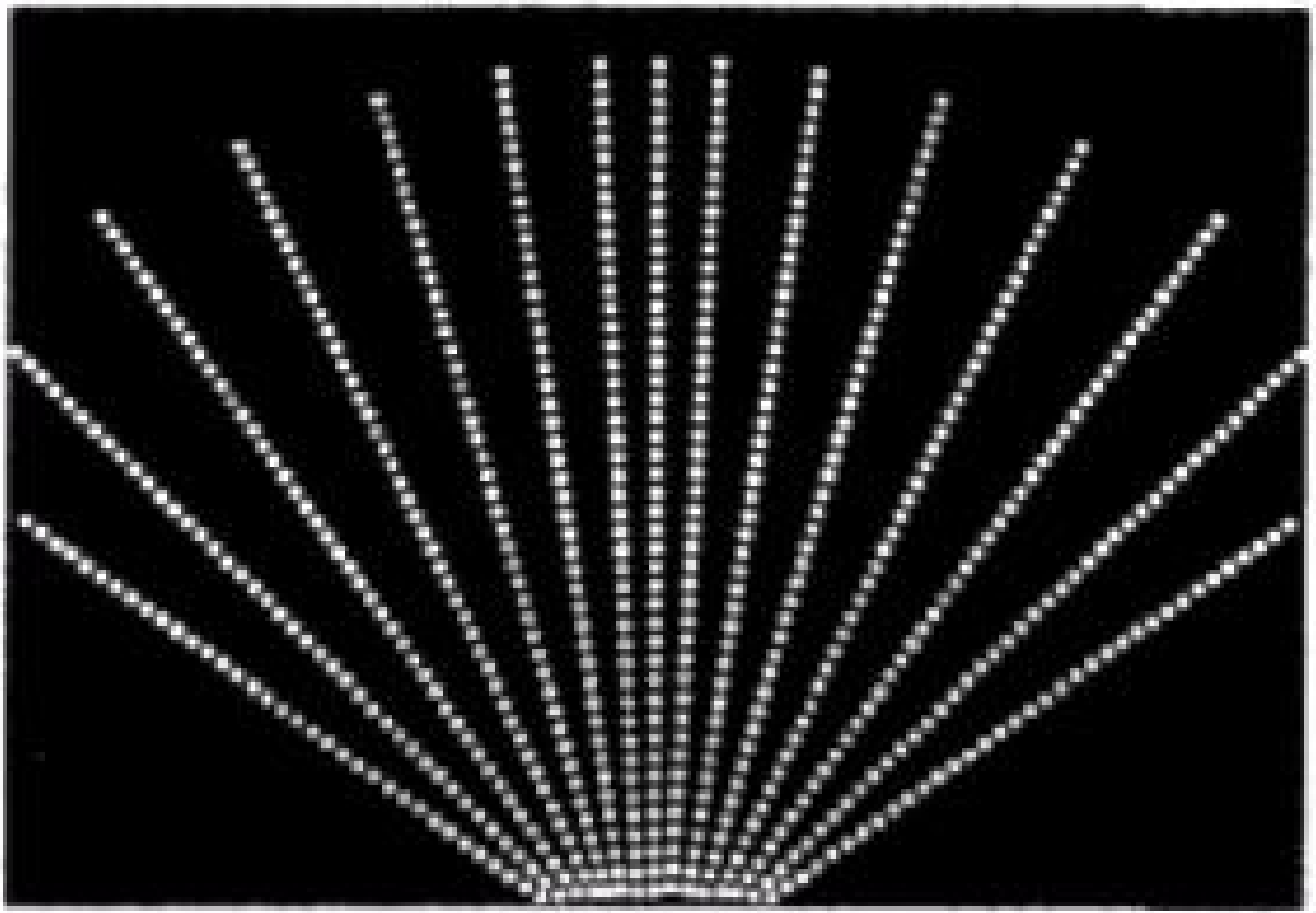
Мал. 2.227



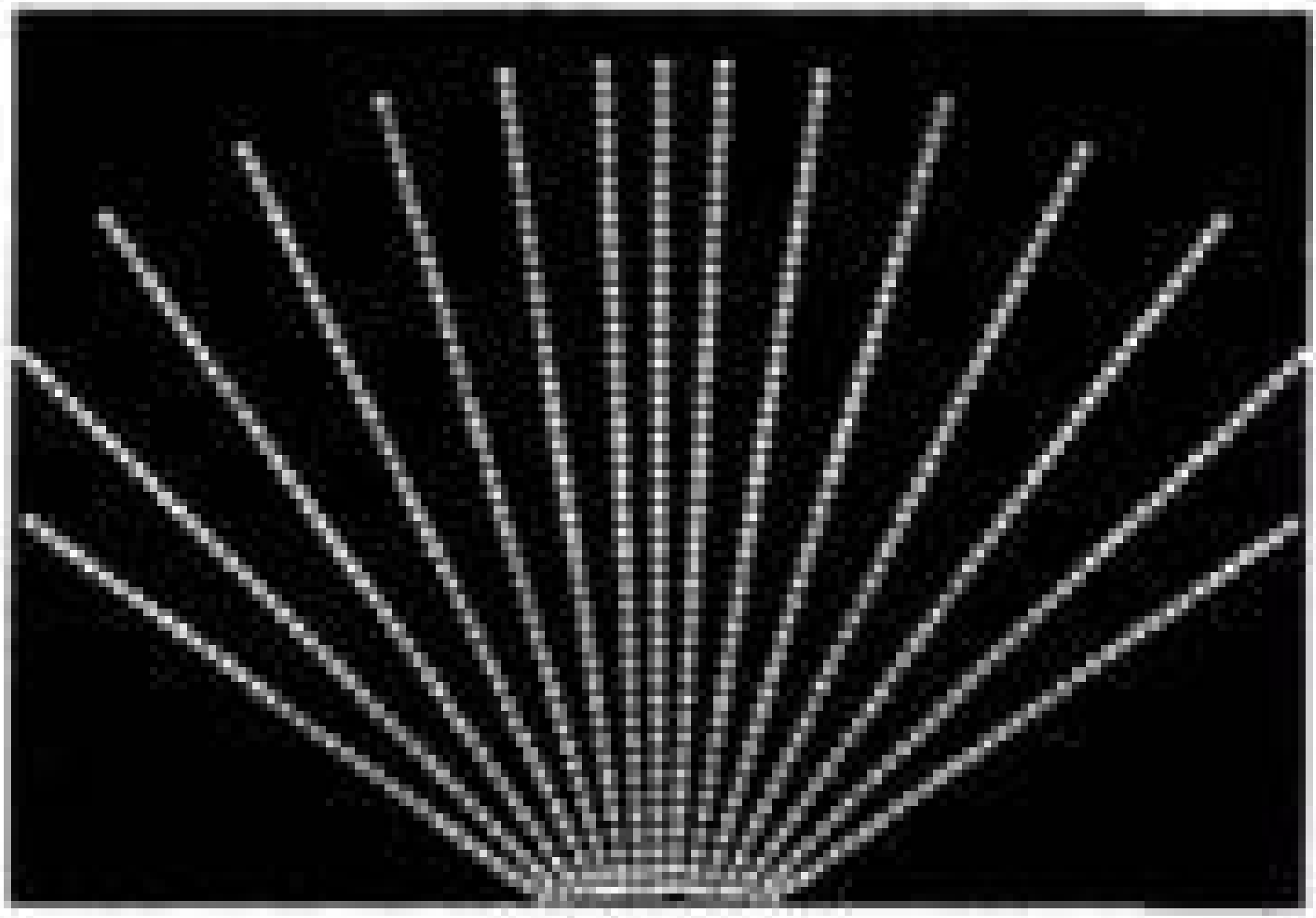
Мал. 2.228



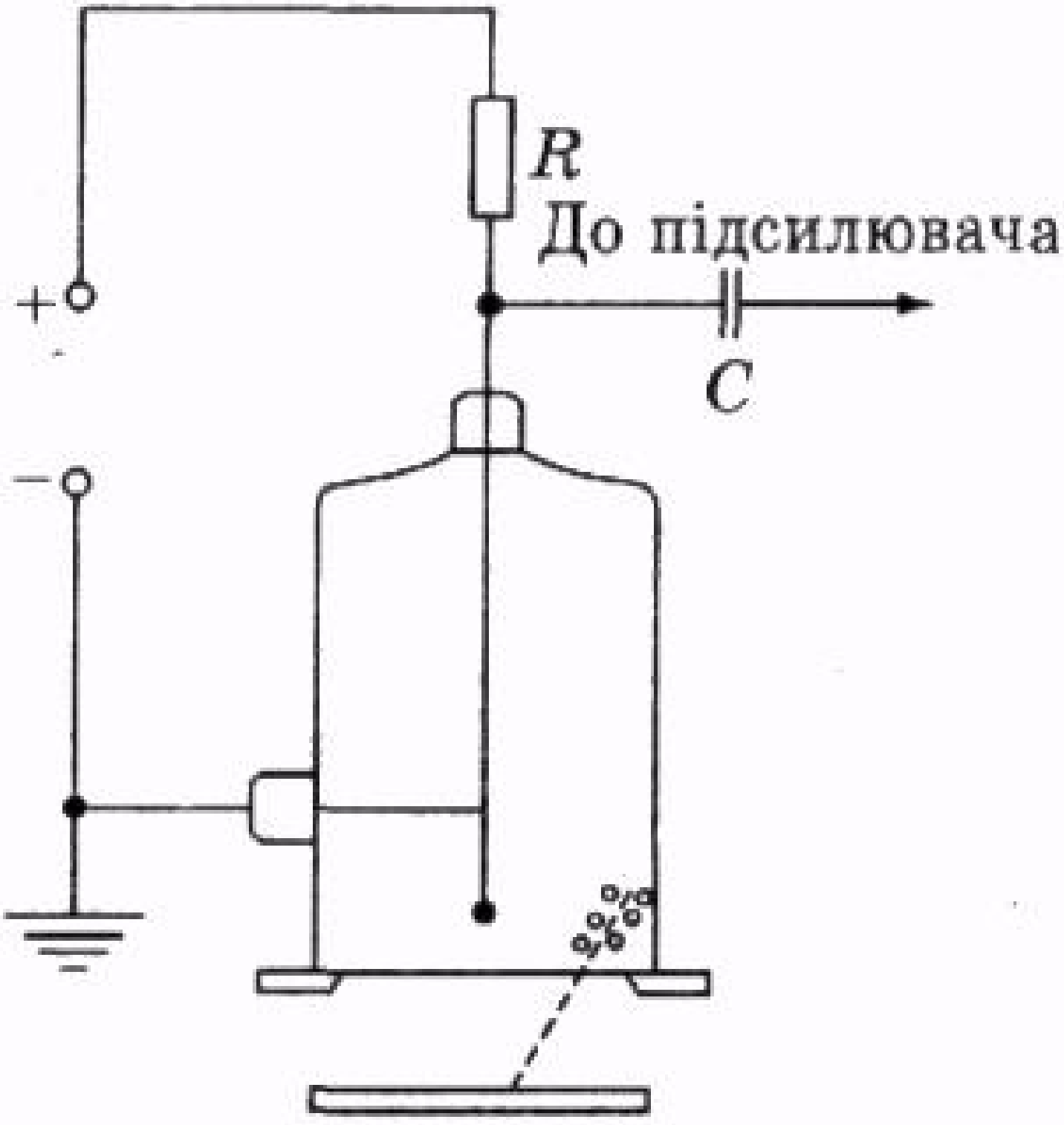
Мал. 2.228



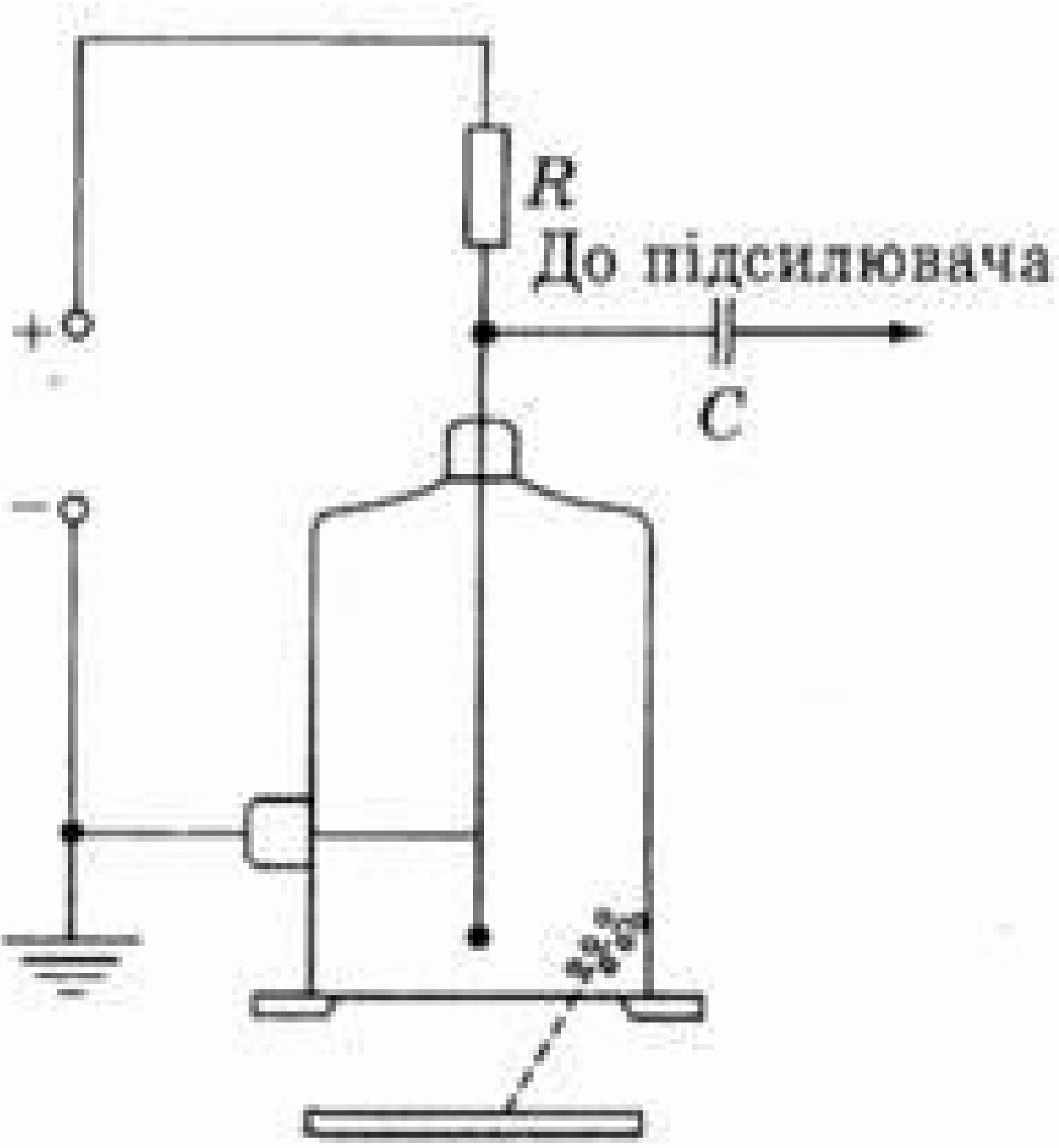
Мал. 2.229



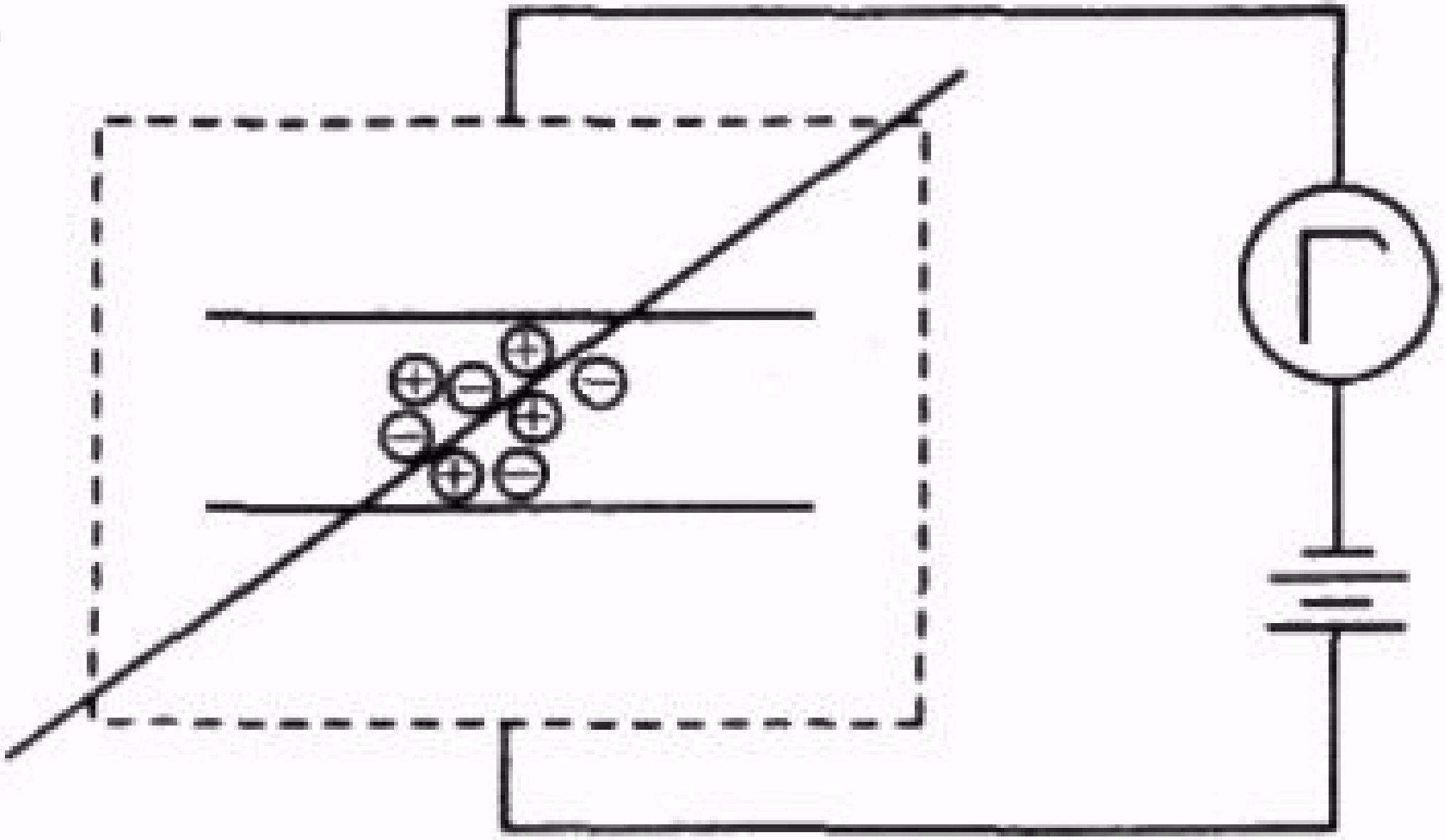
Мал. 2.229



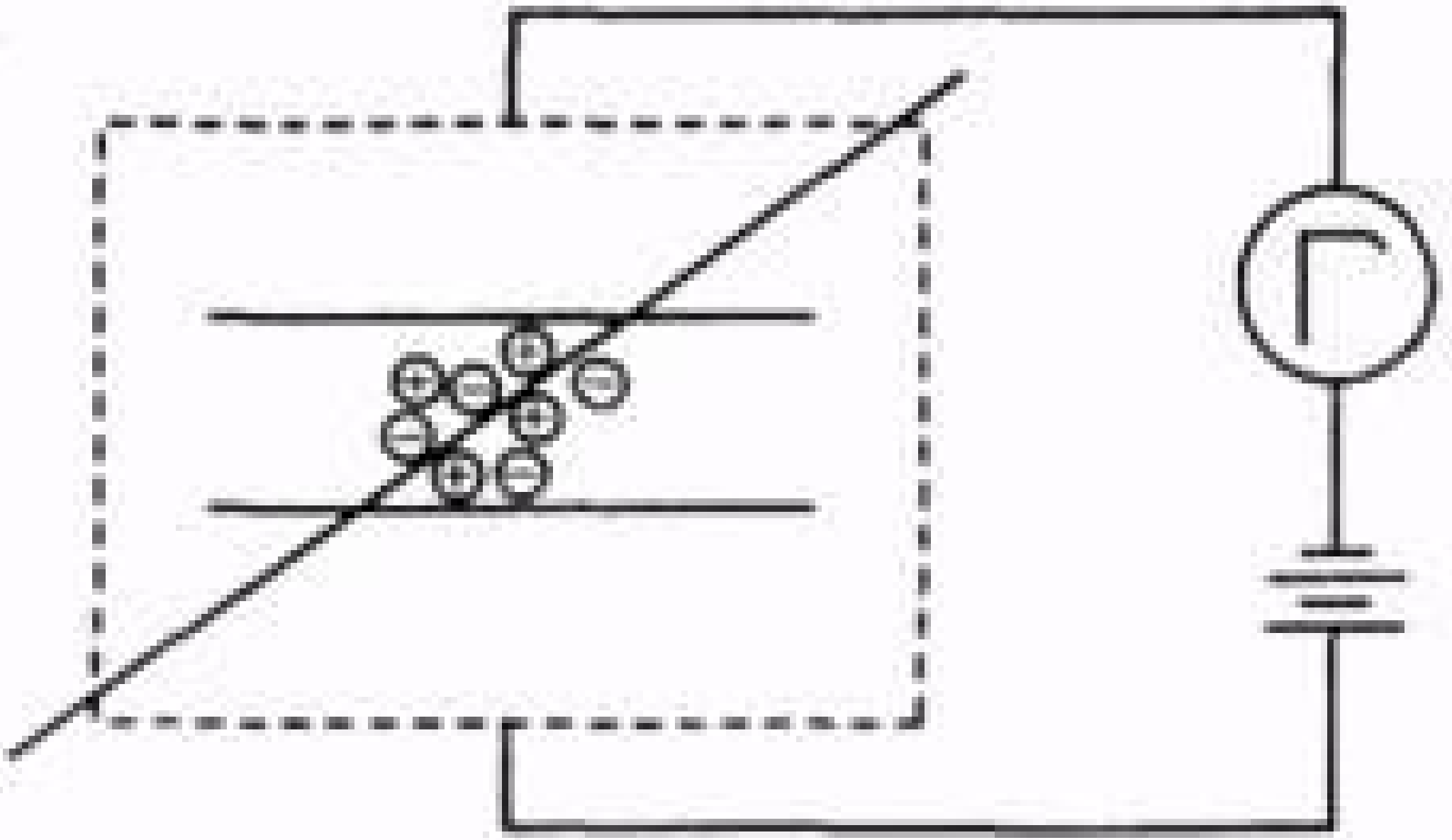
Мал. 2.230



Мал. 2.230



Мал. 2.231



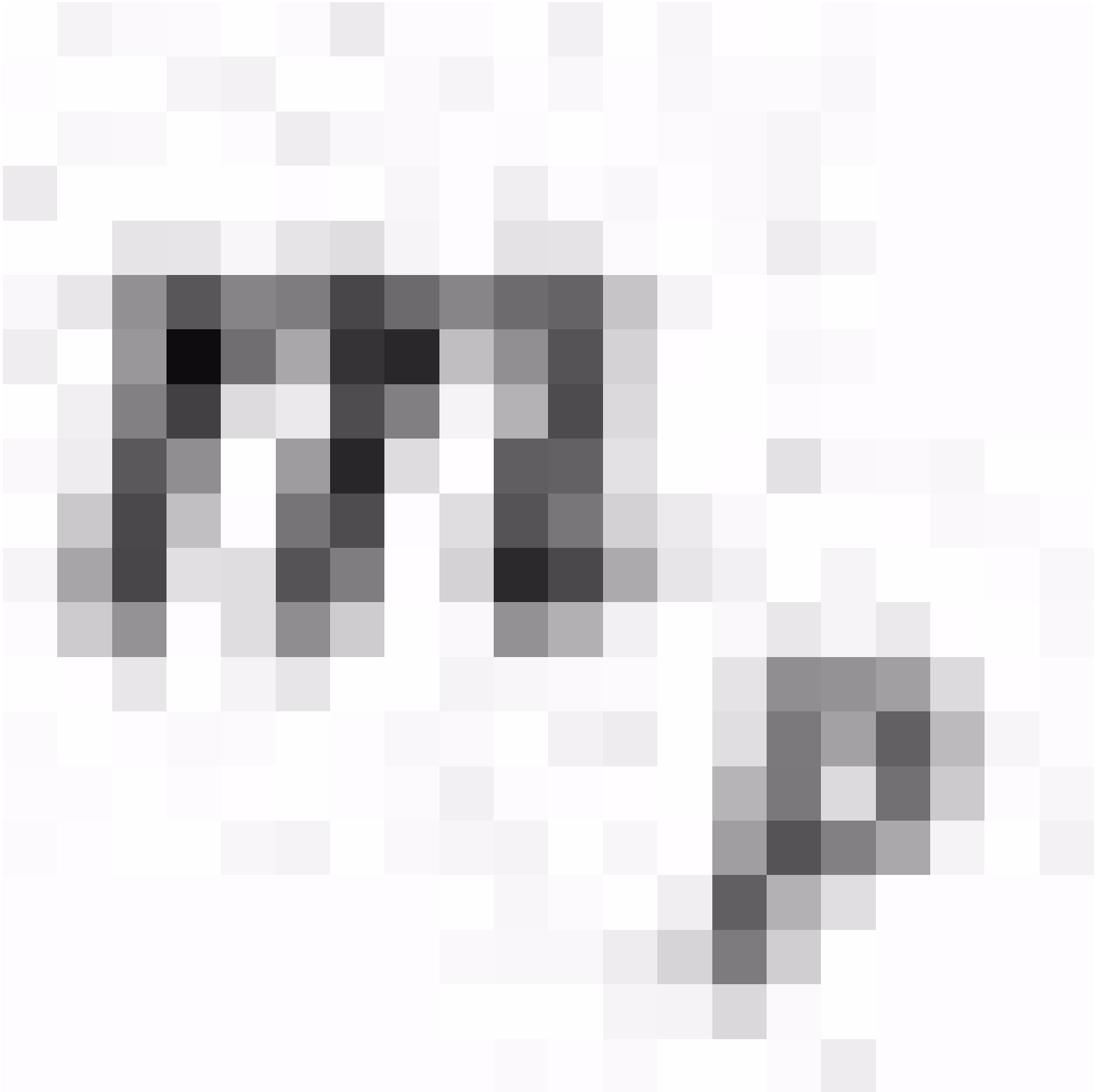
Мал. 2.231

$$m_e = 9{,}11 \cdot 10^{-31} \text{ кг},$$

$$m_e = 9{,}11 \cdot 10^{-31}\ \text{кг}.$$

$$e = 1{,}60 \cdot 10^{-19}\ \text{Кл}.$$

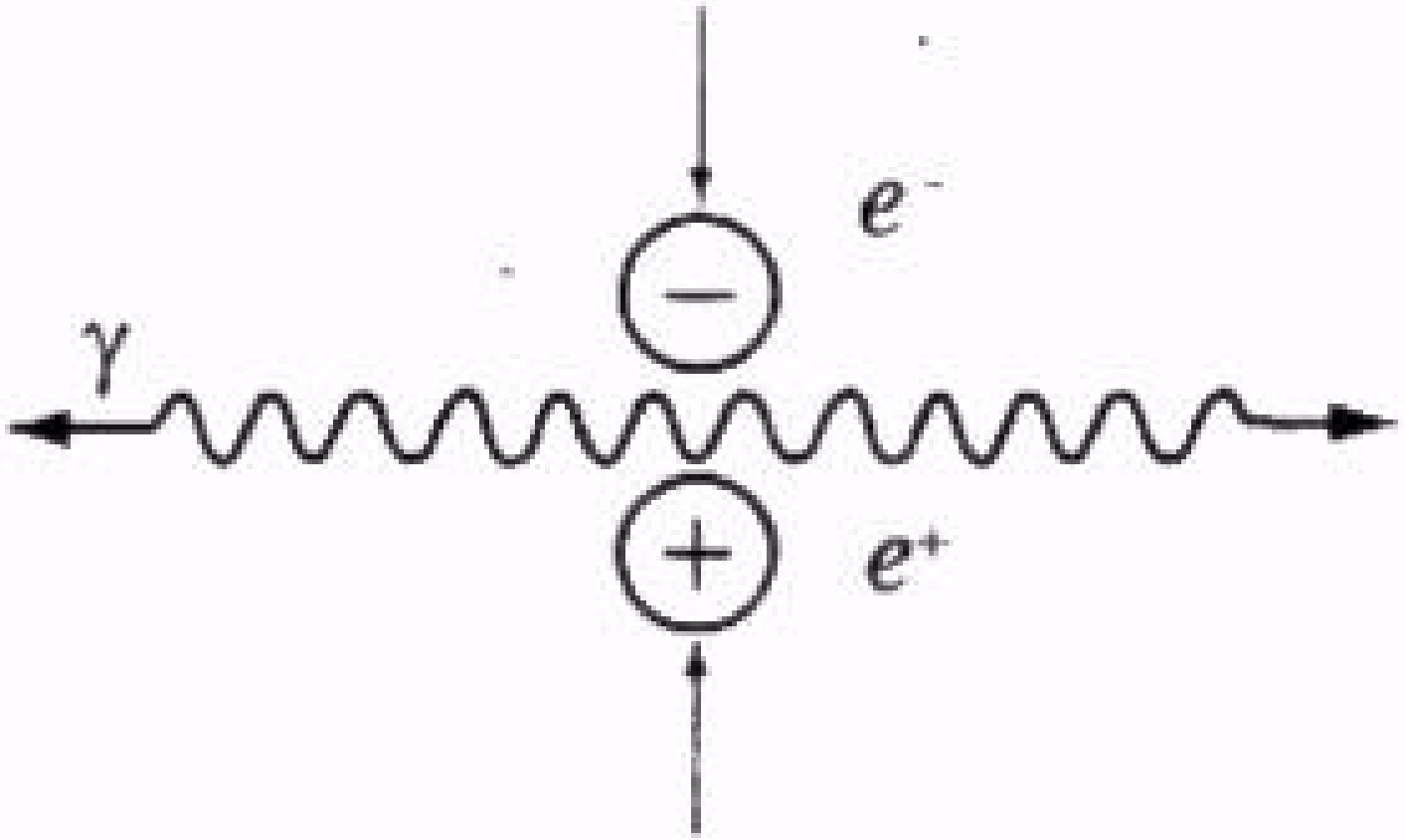
$$e = 1{,}60 \cdot 10^{-19}\ \text{Кл}.$$



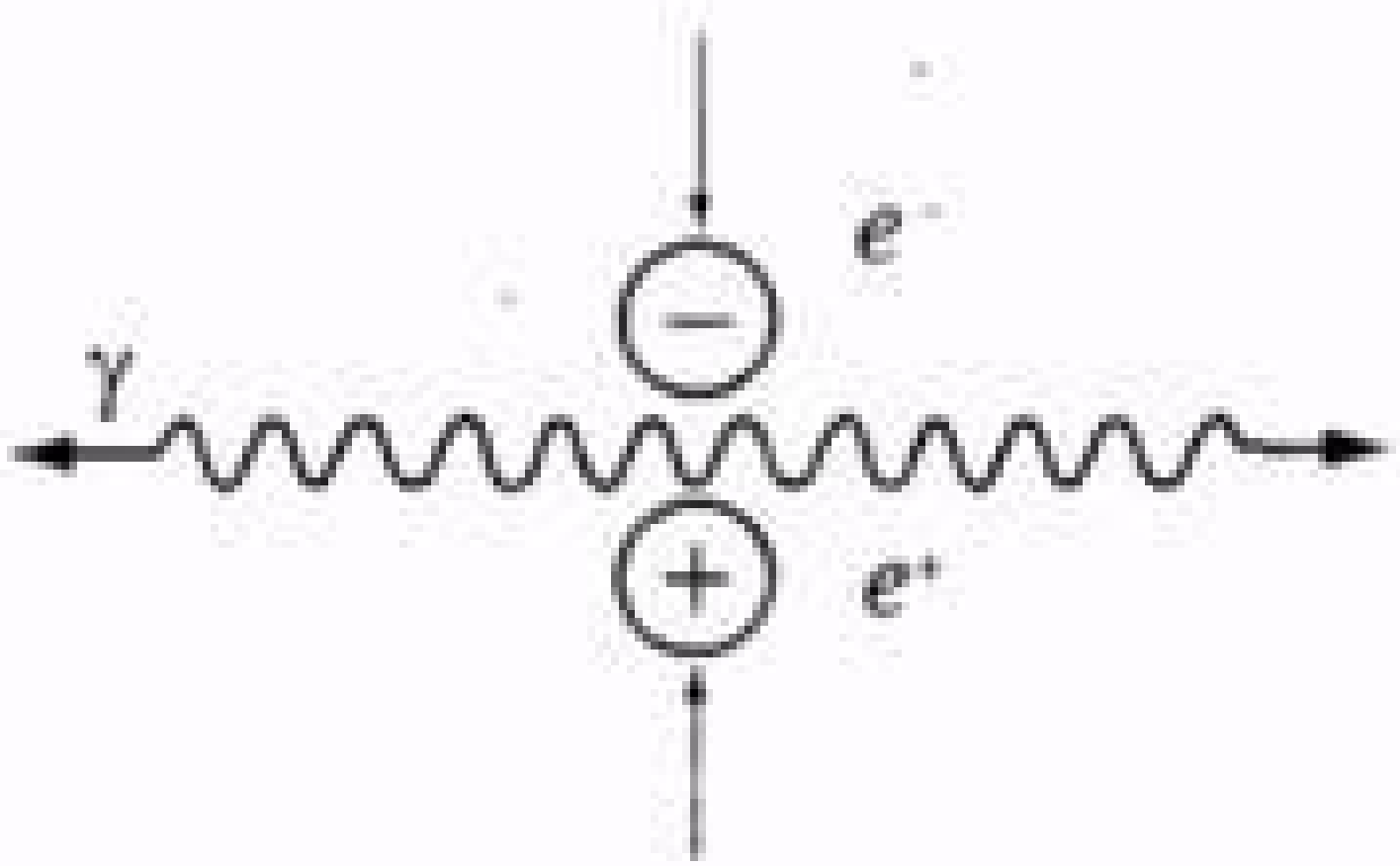
$$m_p = 1{,}67 \cdot 10^{-27} \text{ кг}$$

$$m_p = 1{,}67 \cdot 10^{-27}\ \text{kr}$$

$2,6 \cdot 10^{-8}$ с.

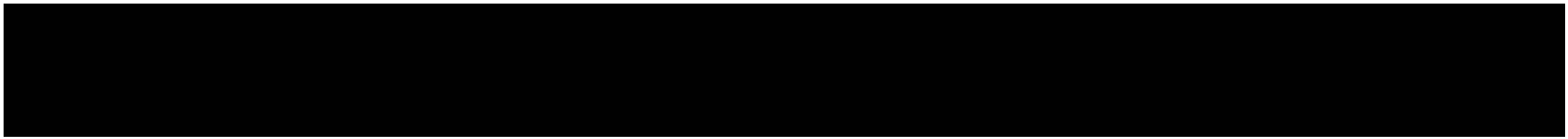


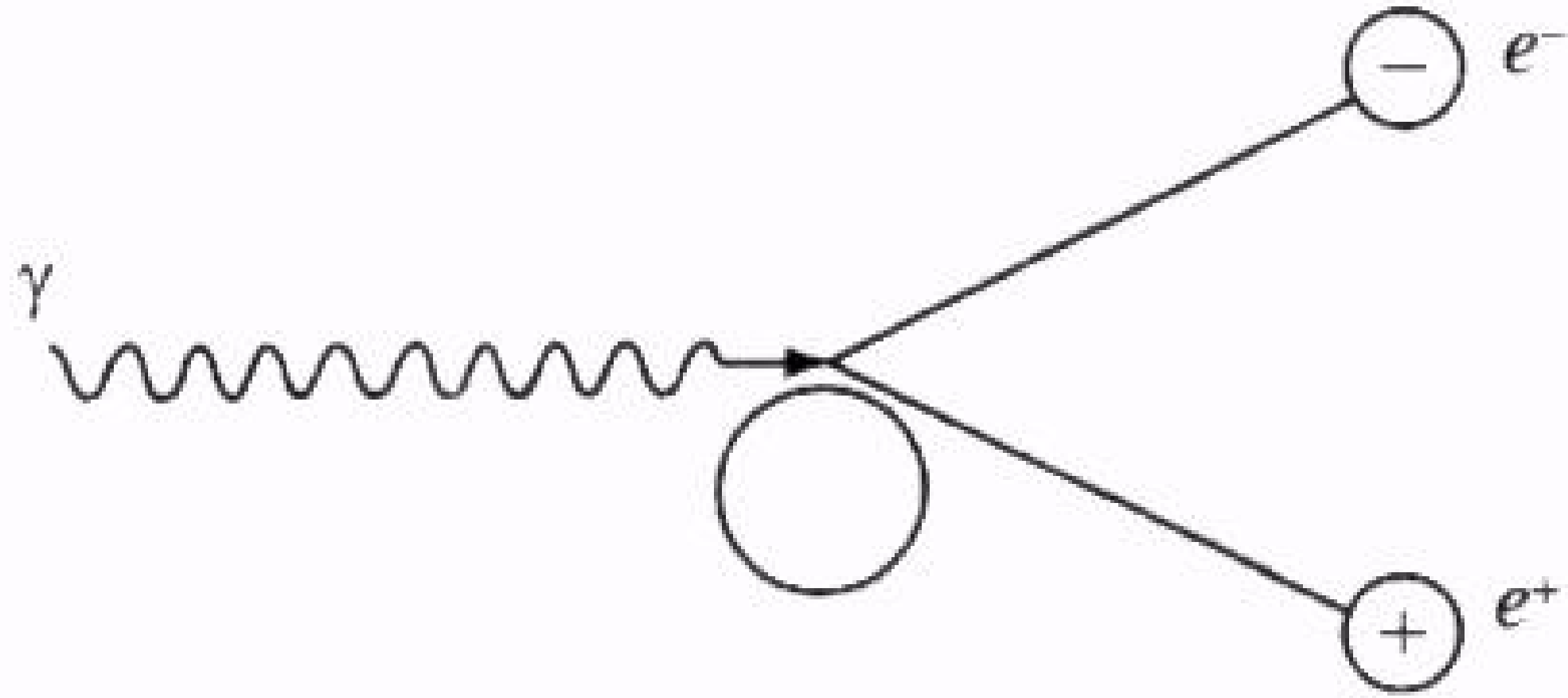
Мал. 2.232



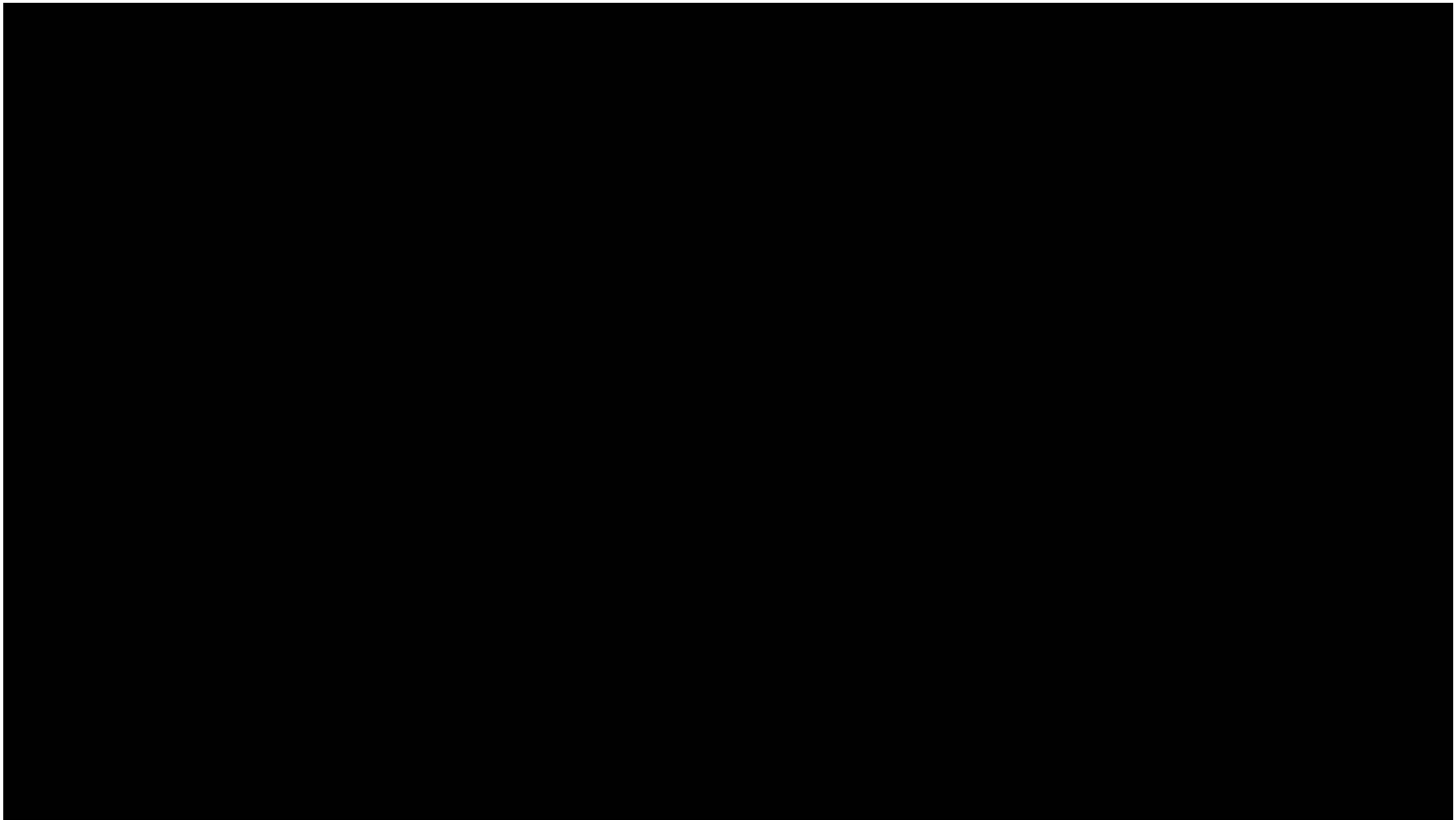
Мал. 2.232

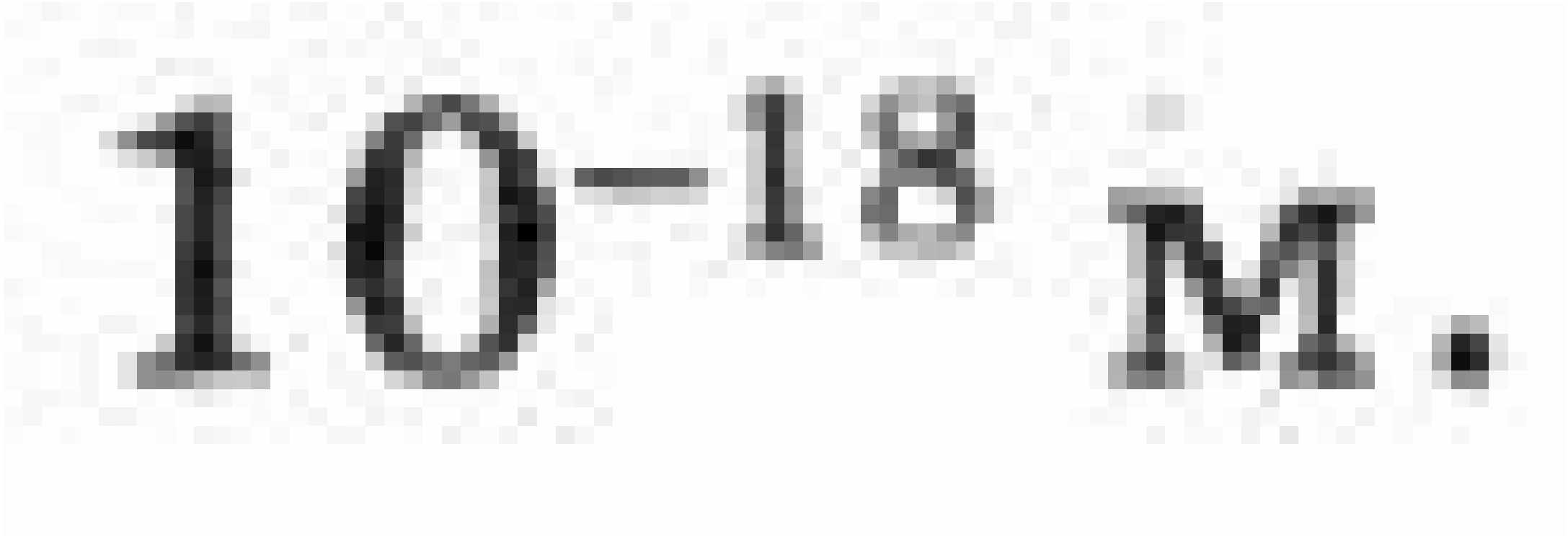
$$h\nu > 2m_e c^2 = 2 \cdot 0{,}511 \text{ МеВ} = 1{,}022 \text{ МеВ}.$$

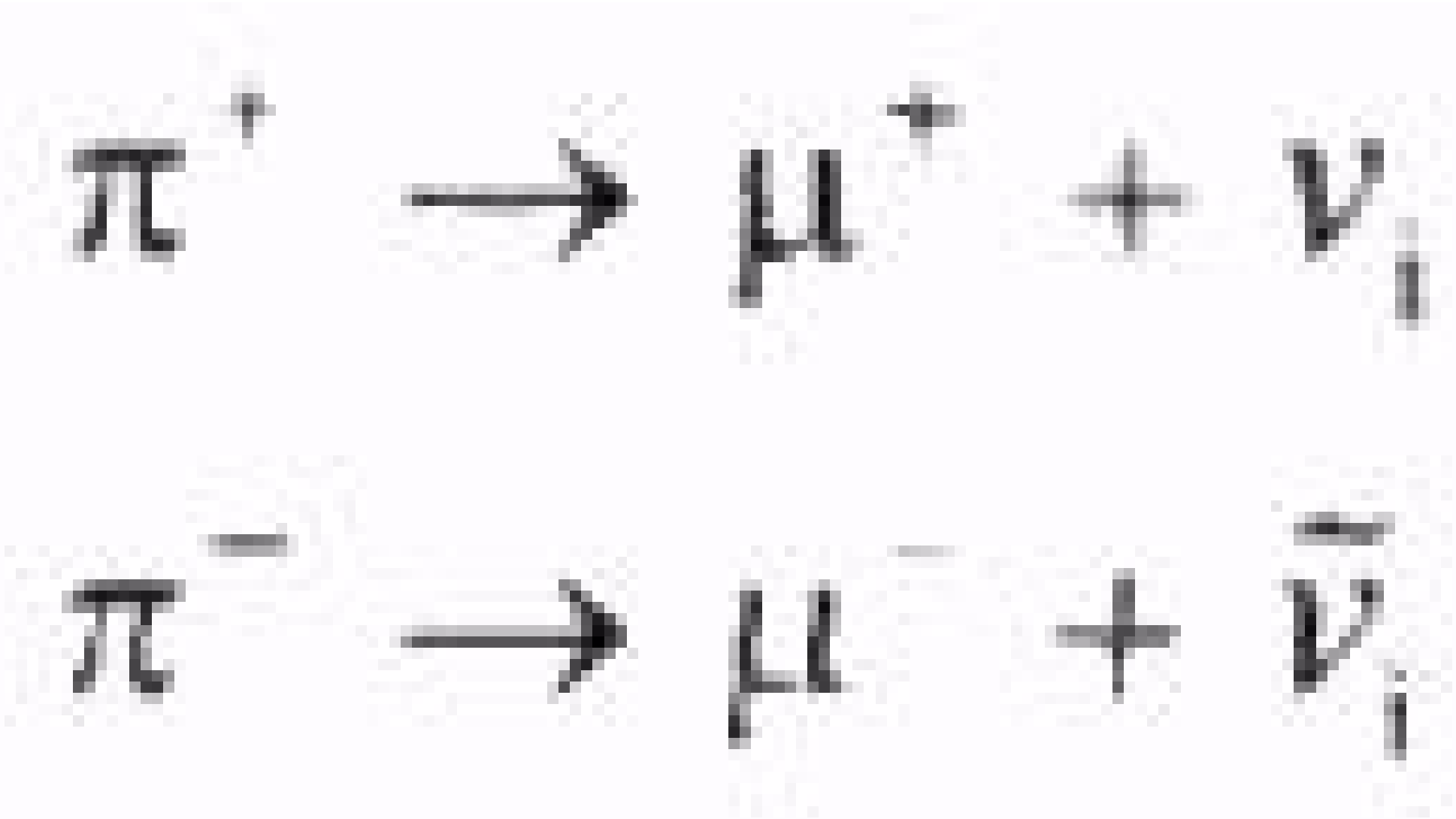




Мал. 2.233

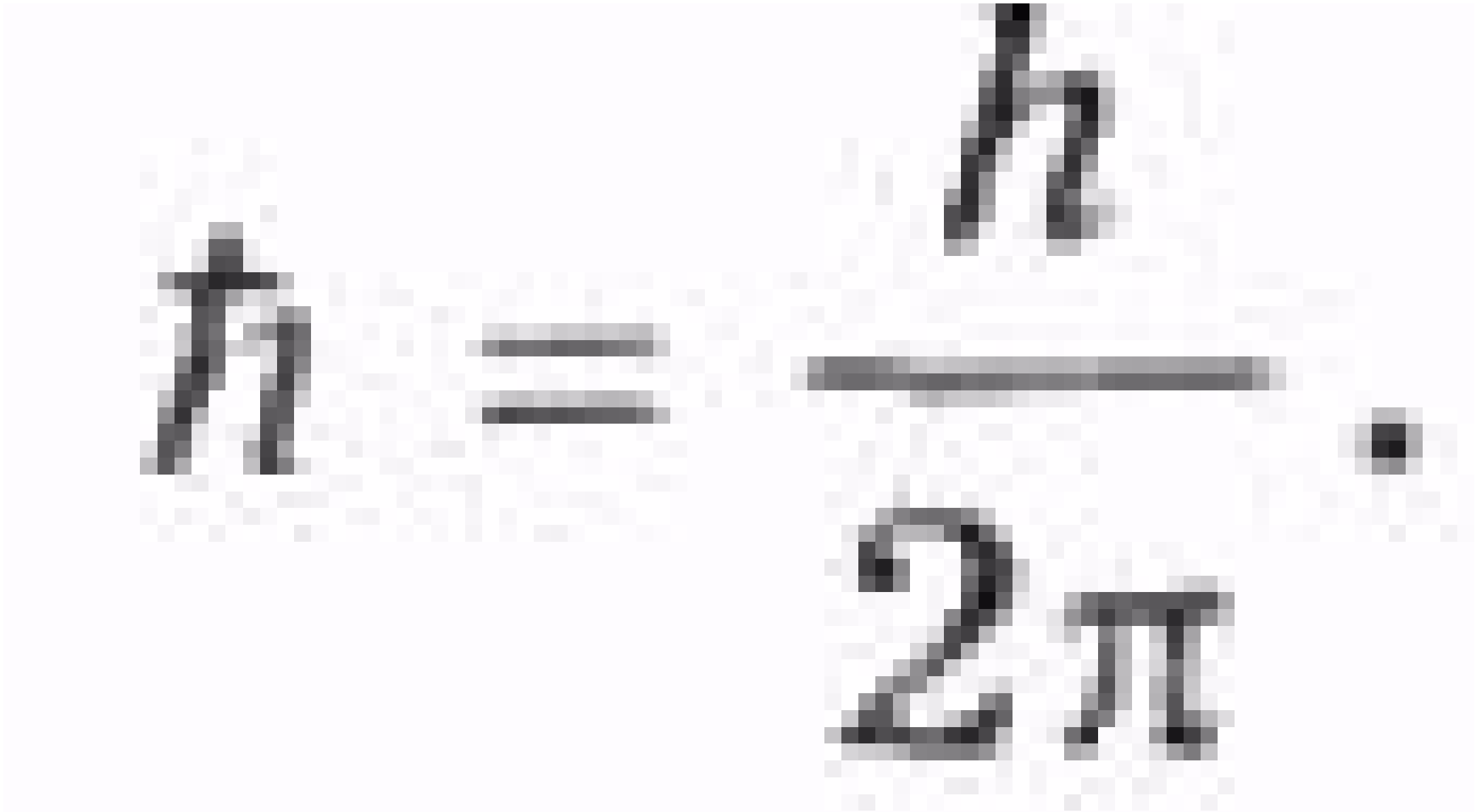


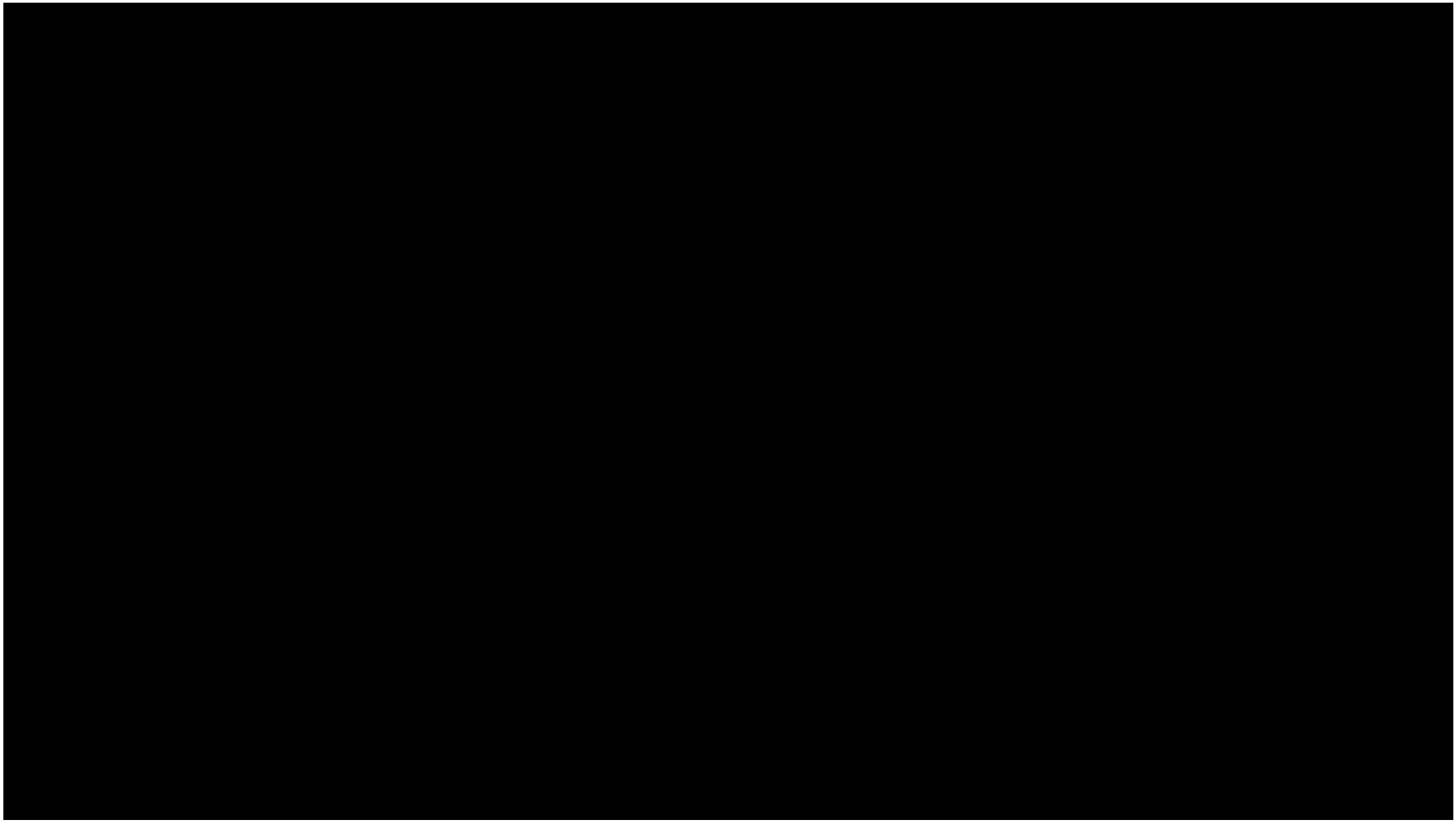

10-18

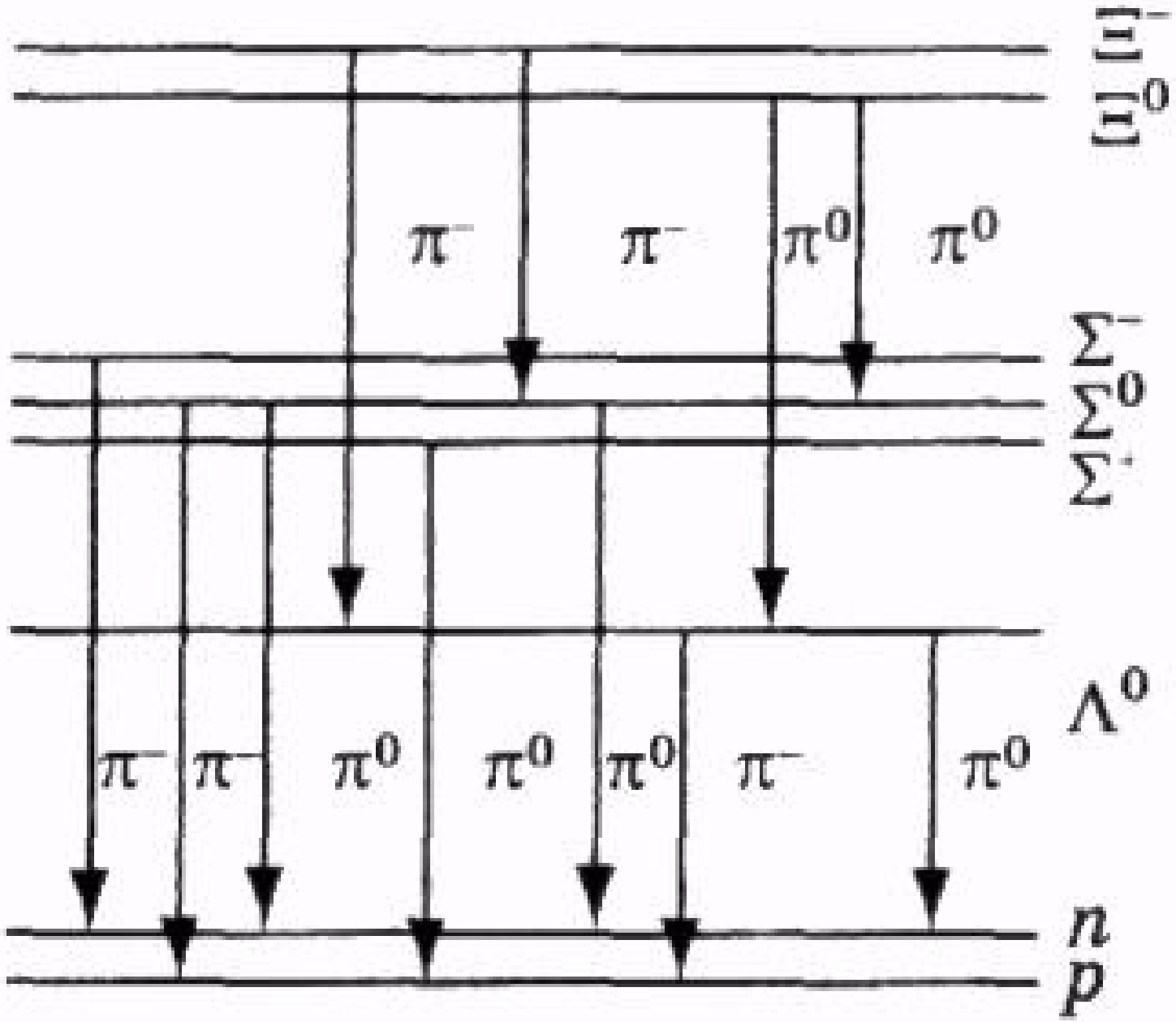


$$\mu^+ \rightarrow e^+ + \nu_e + \tilde{\nu}_i ,$$

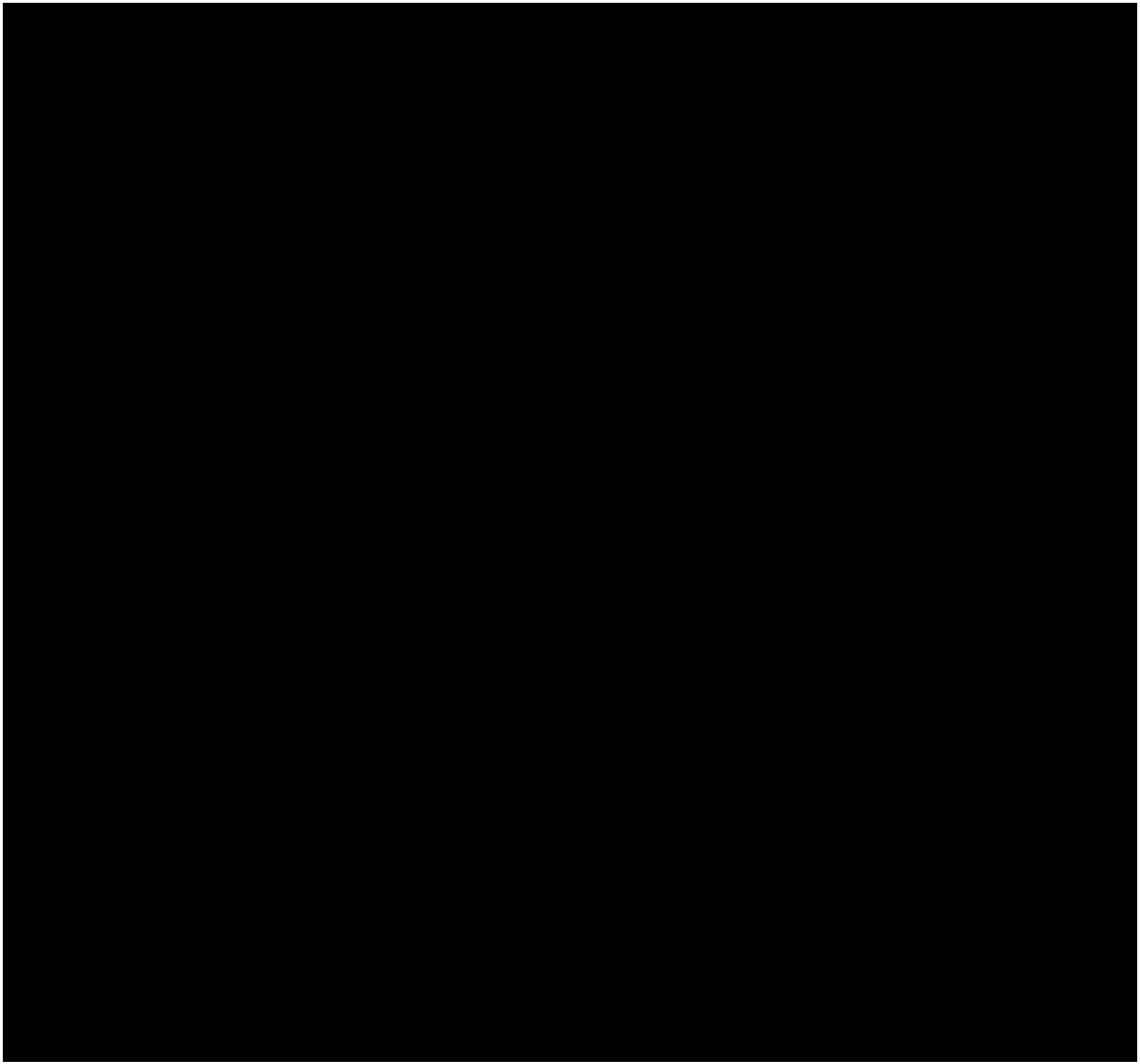
$$\mu^- \rightarrow e^- + \nu_e + \nu_i .$$

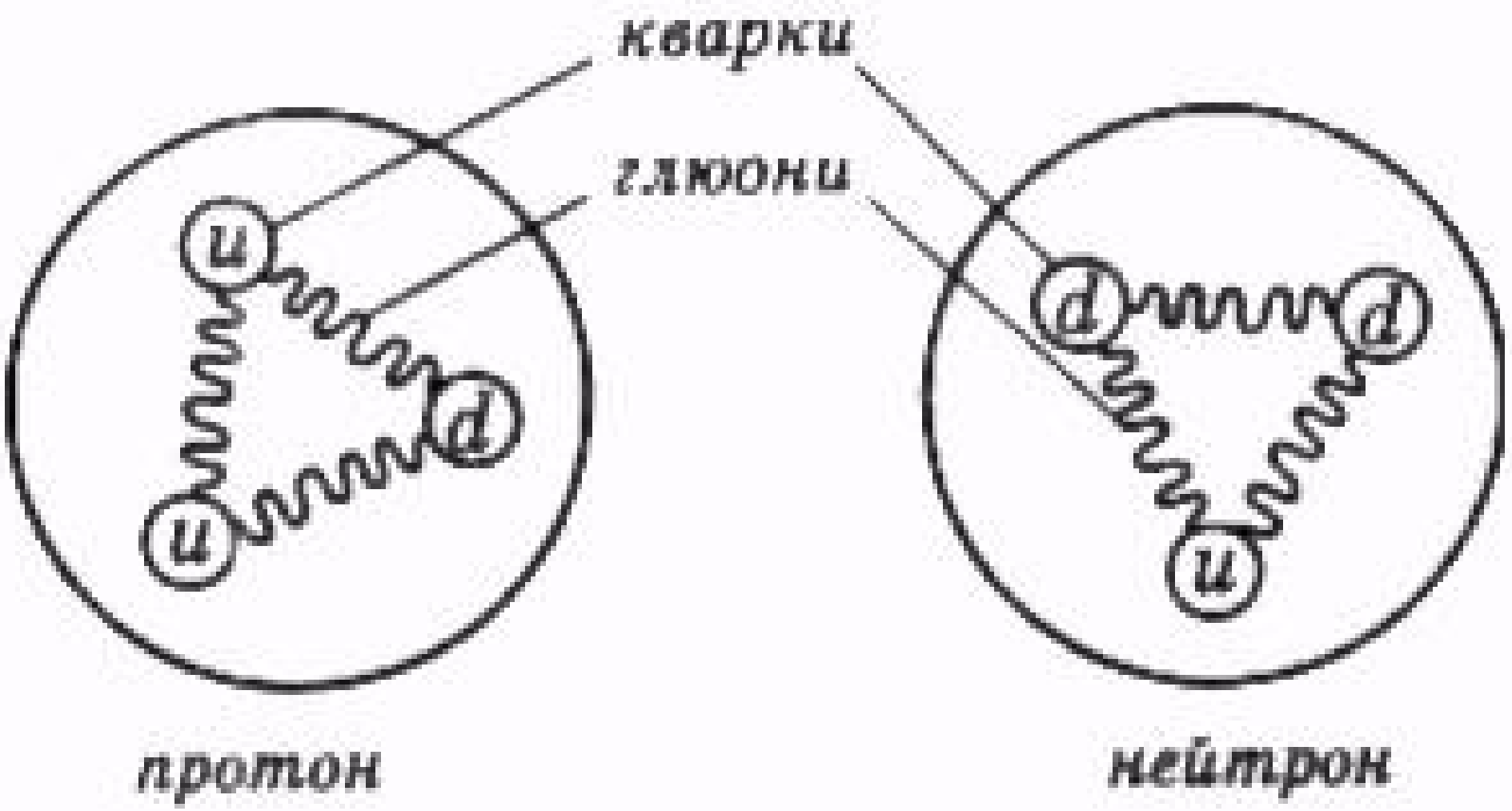




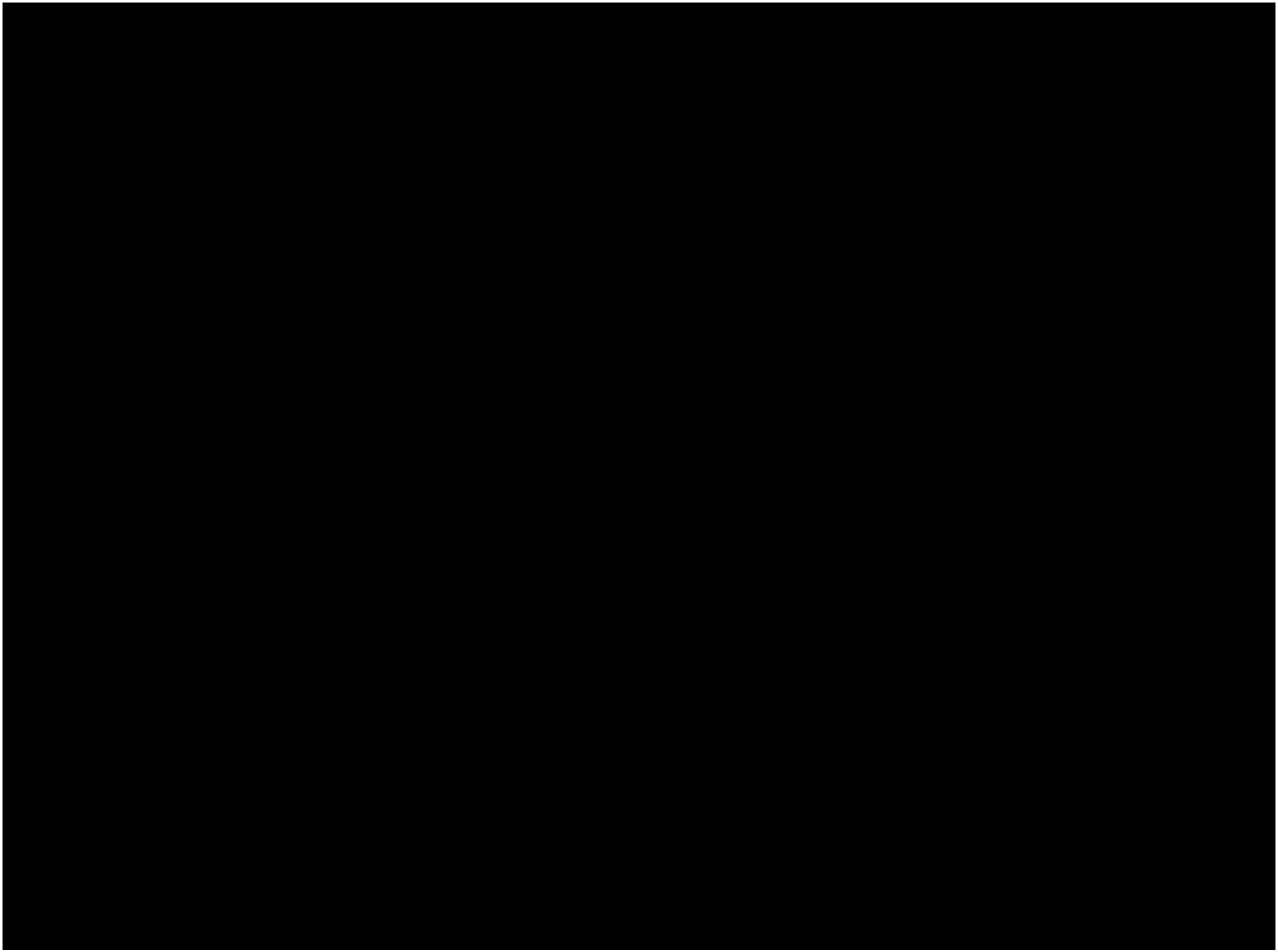

Ξ^- Ξ^0
π^- π^- π^0 π^0
Σ^- Σ^0 Σ^+
Λ^0
π^- π^- π^0 π^0 π^0 π^- π^0
n
p

Мал. 2.234



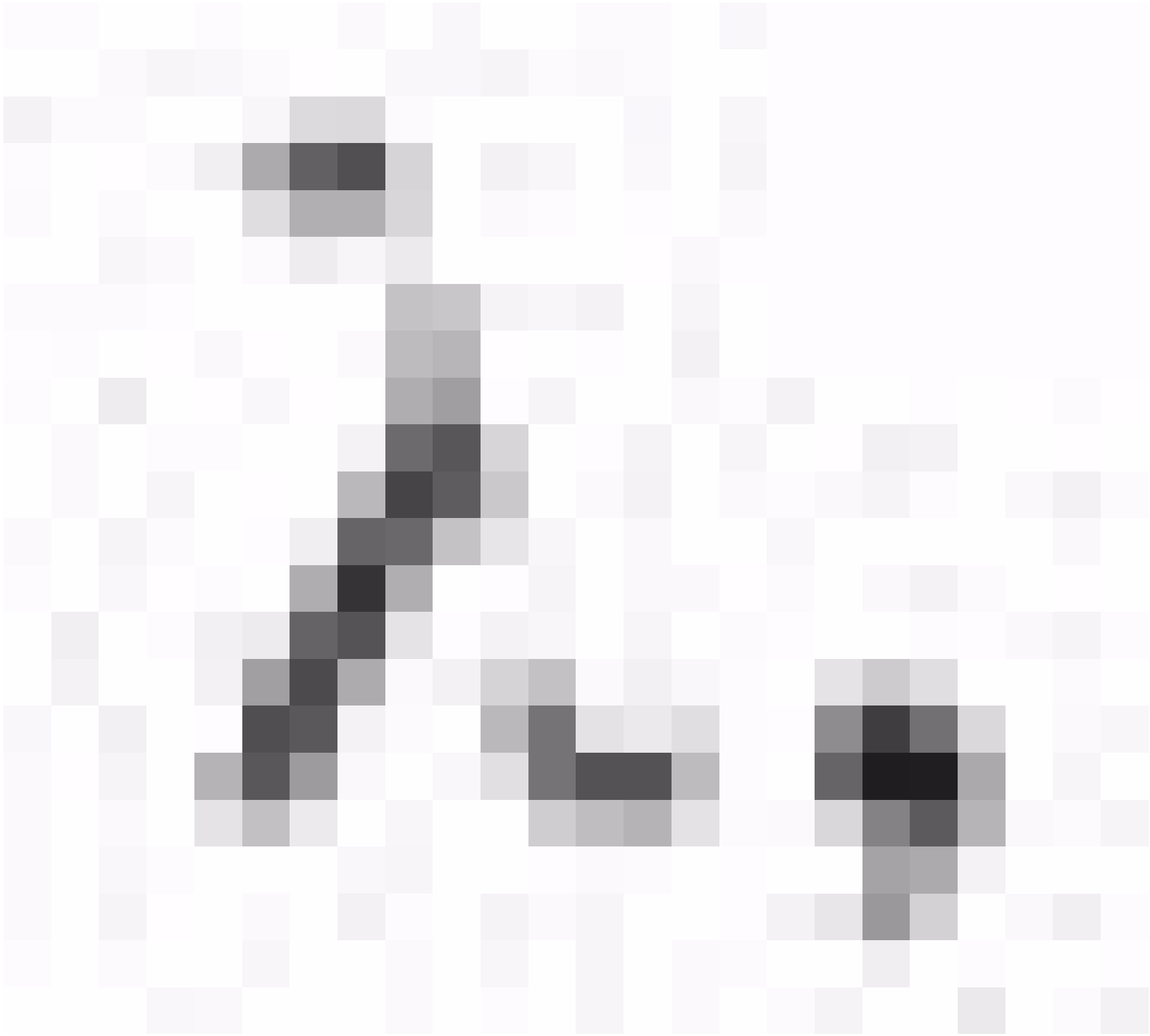


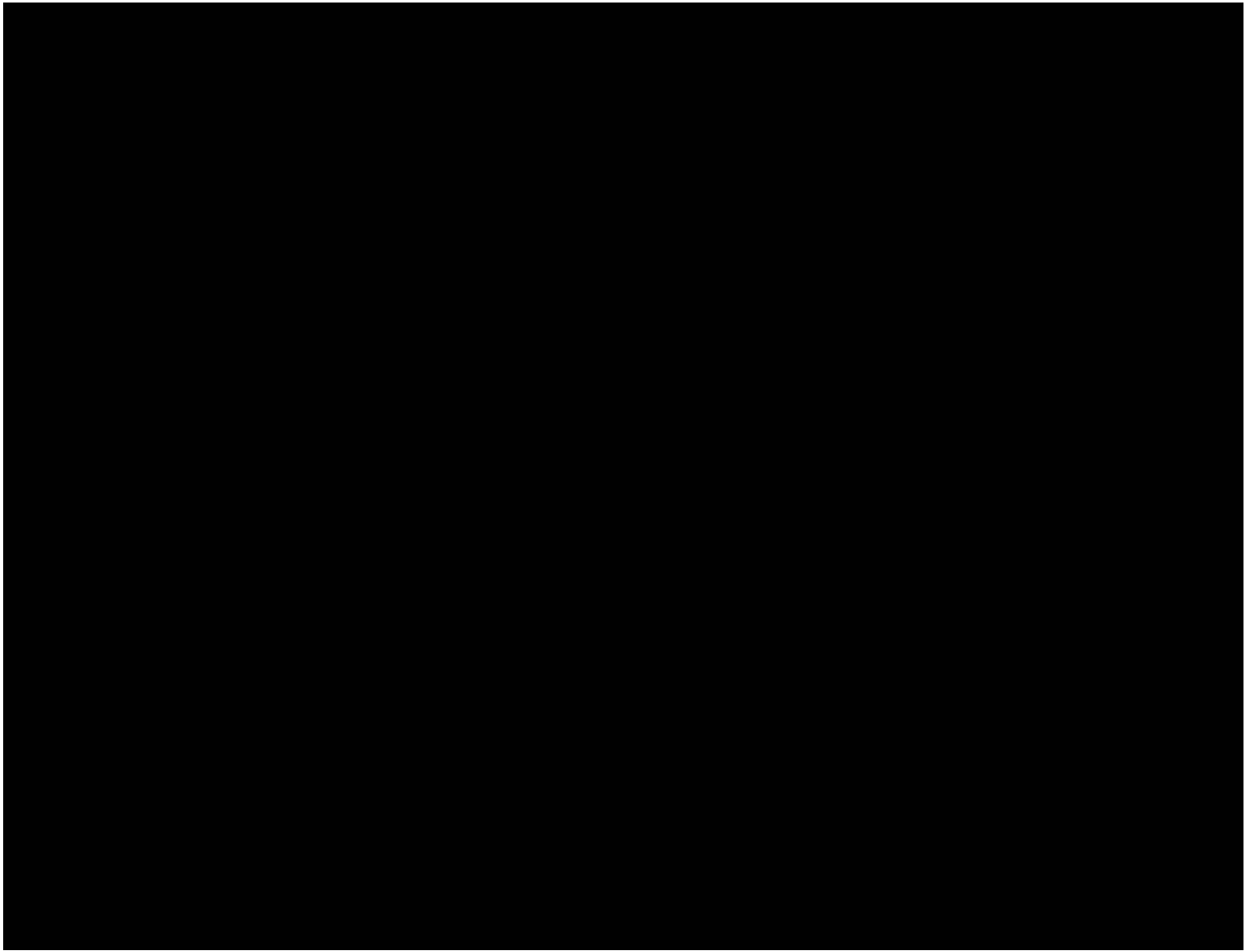
Мал. 2.235



$$+\frac{2}{3}e+\frac{2}{3}e-\frac{1}{3}e=+e,$$

$$-\frac{1}{3}e-\frac{1}{3}e+\frac{2}{3}e=0.$$





$$\lambda = \frac{h}{mv} \qquad (65.1),$$