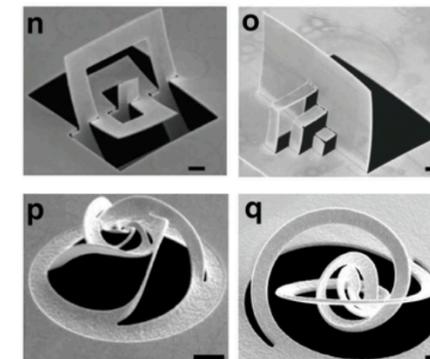
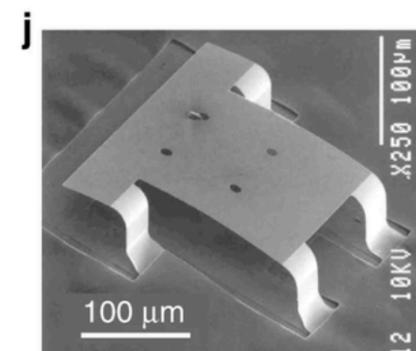
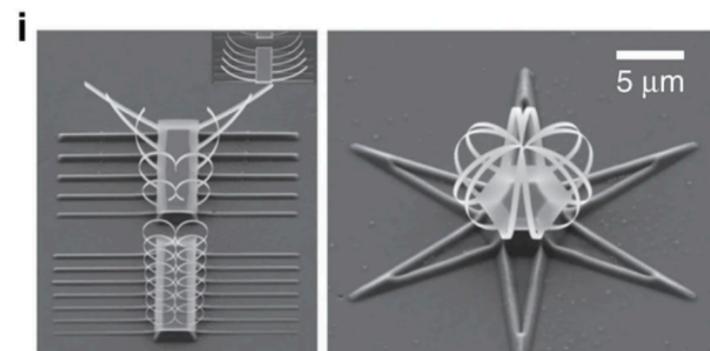
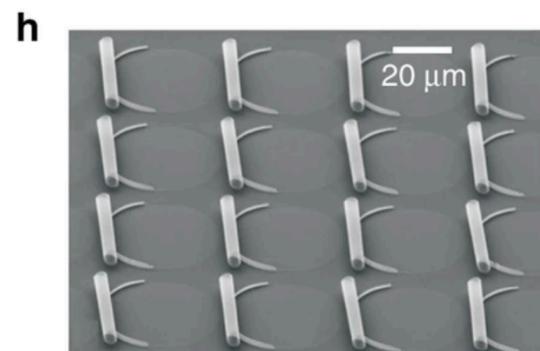
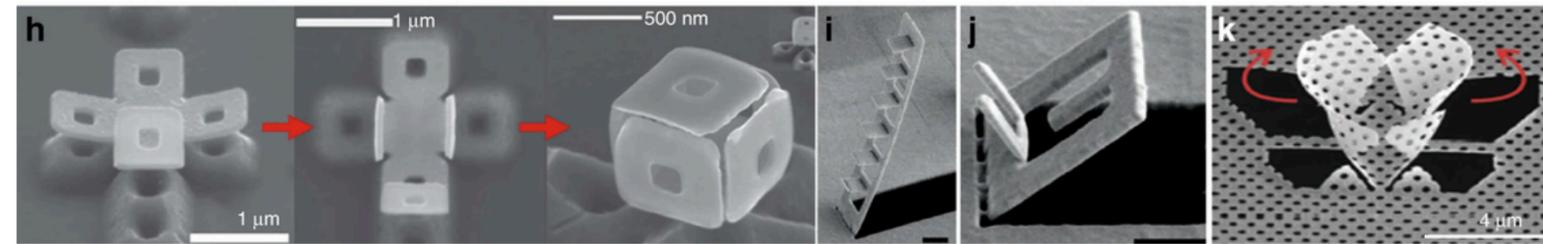
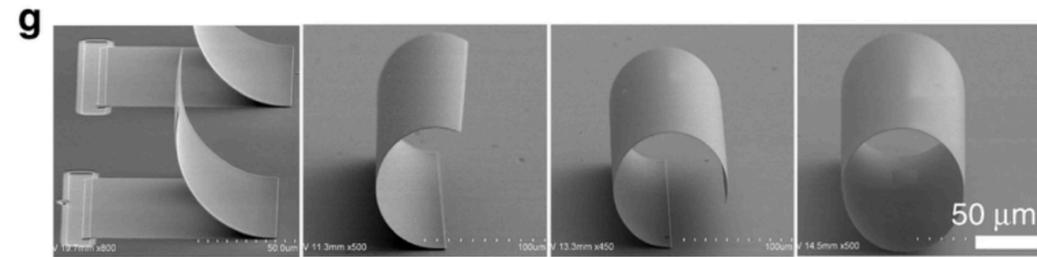


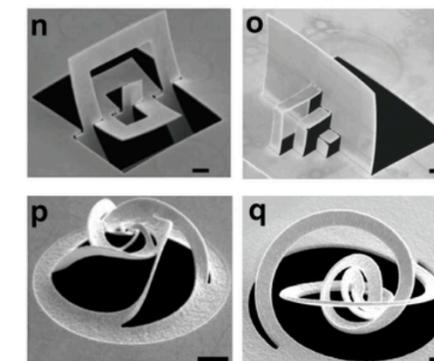
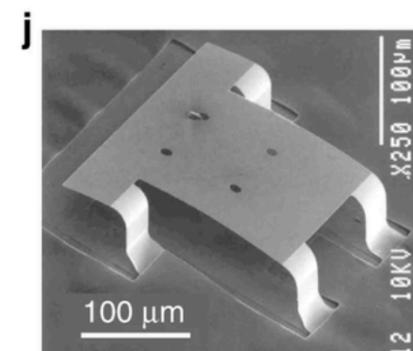
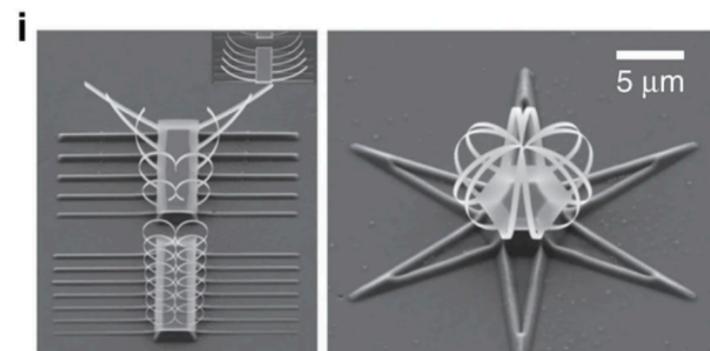
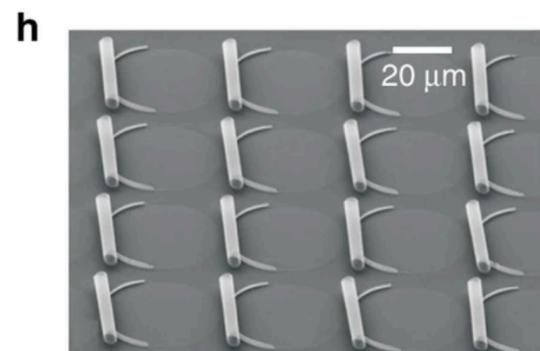
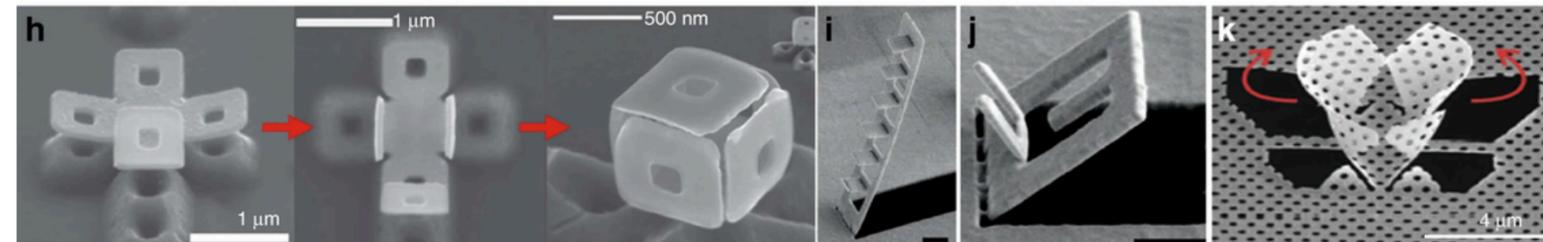
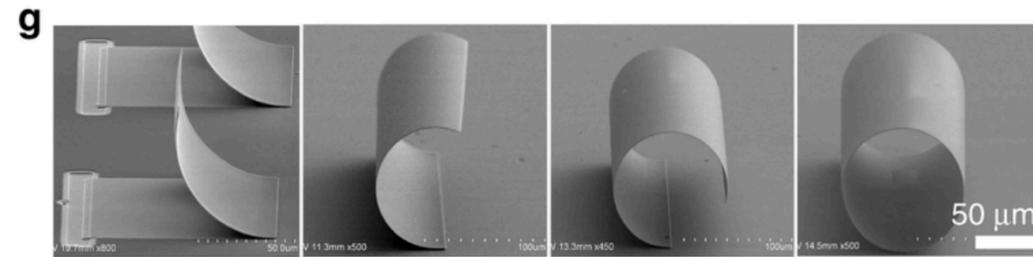
Desvendando o invisível: um mergulho no mundo dos nanomateriais



Washington F. dos Santos

Desvendando o invisível:

Conhecer



Washington F. dos Santos

Nanomateriais



“Materiais quânticos”

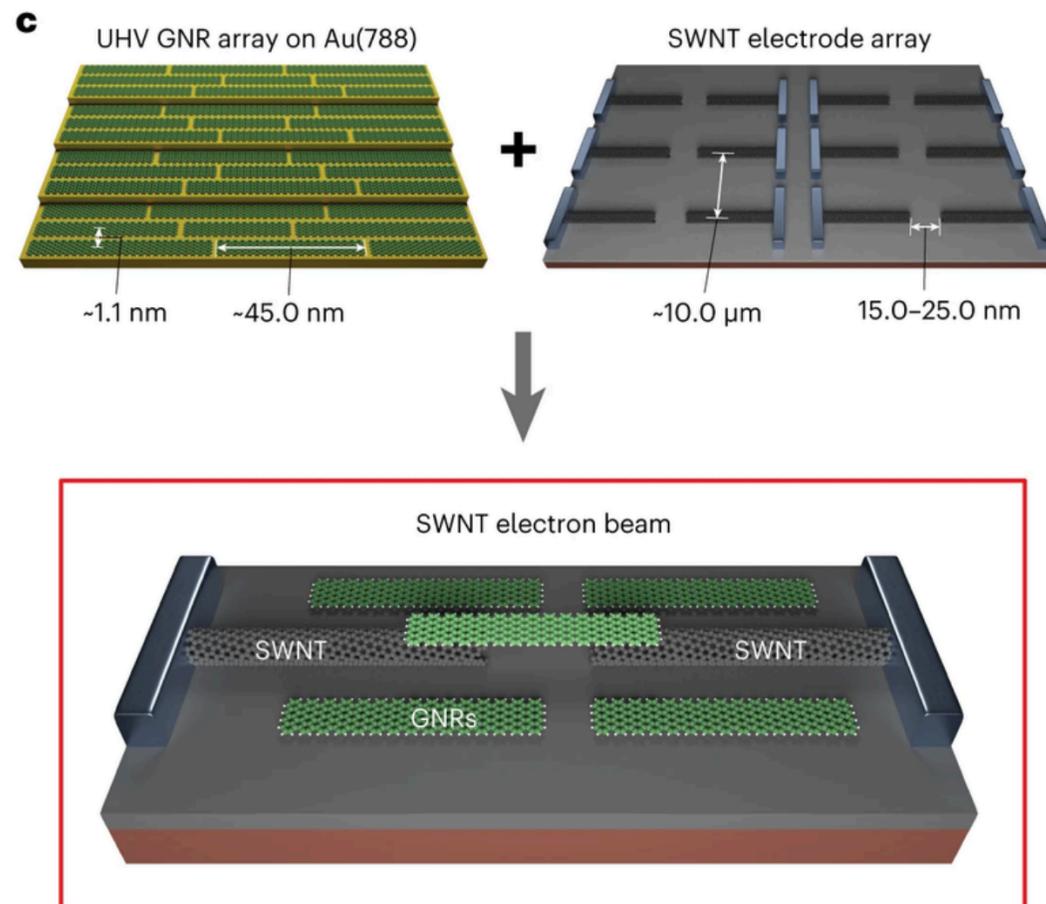
Nanodispositivos

Nanomateriais



“Materiais quânticos”

Nanodispositivos

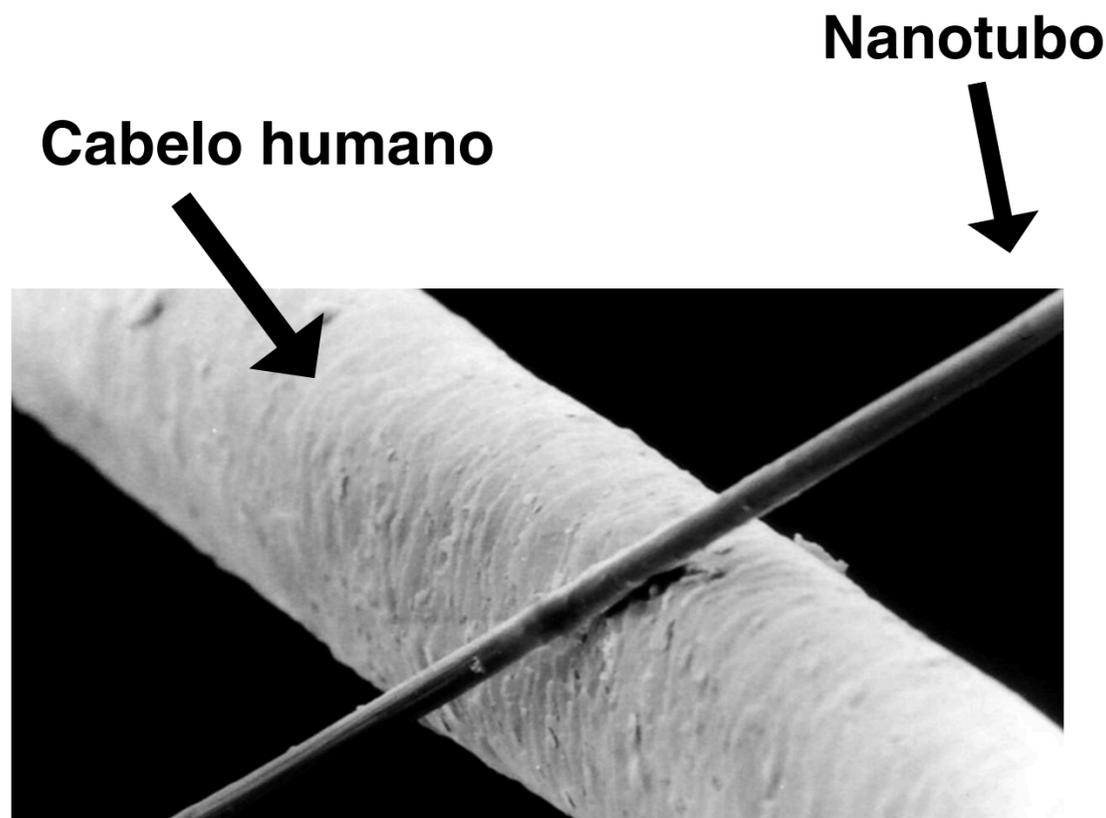
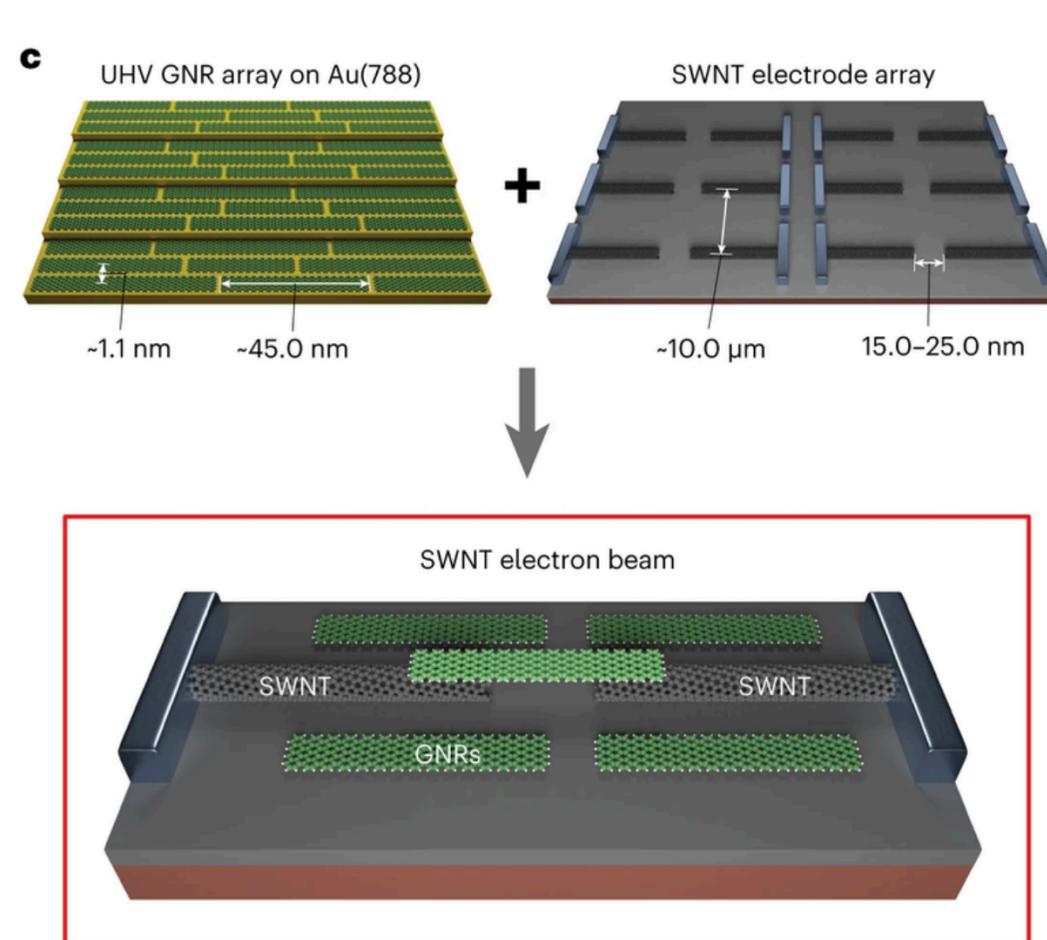


Nanomateriais

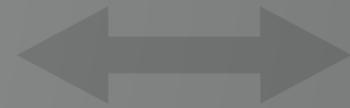


“Materiais quânticos”

Nanodispositivos



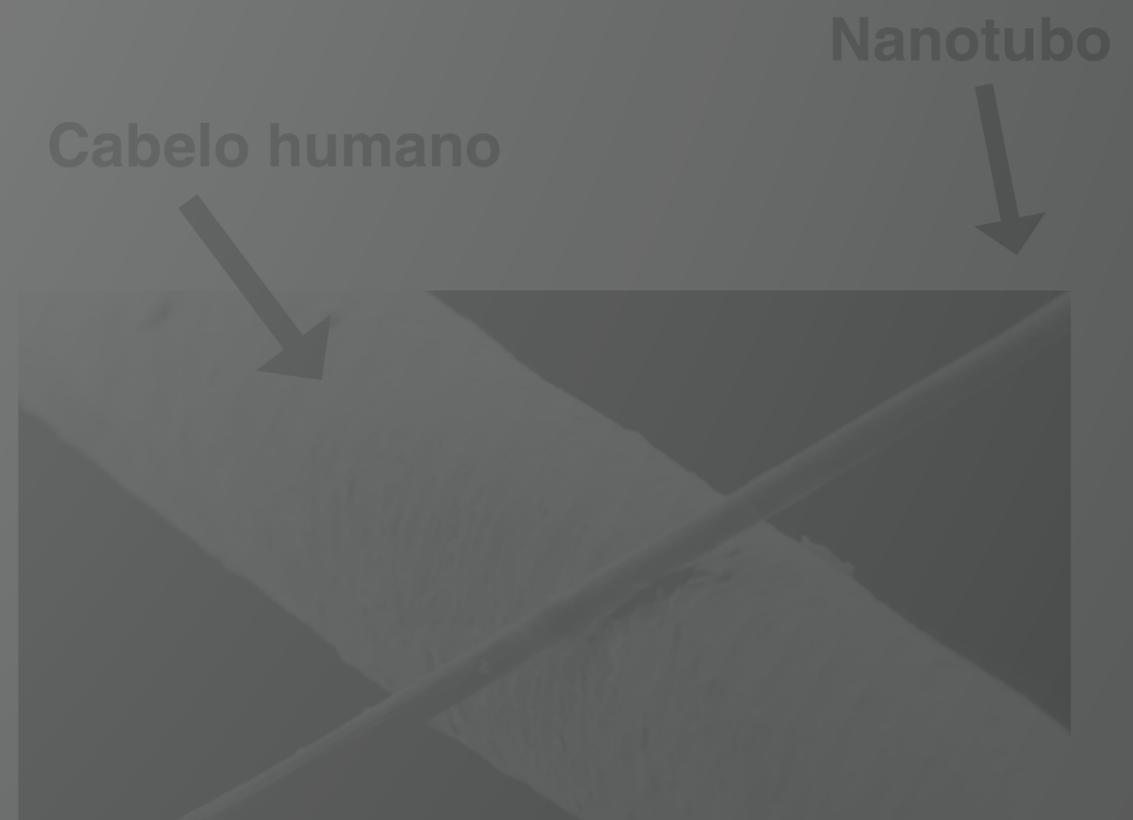
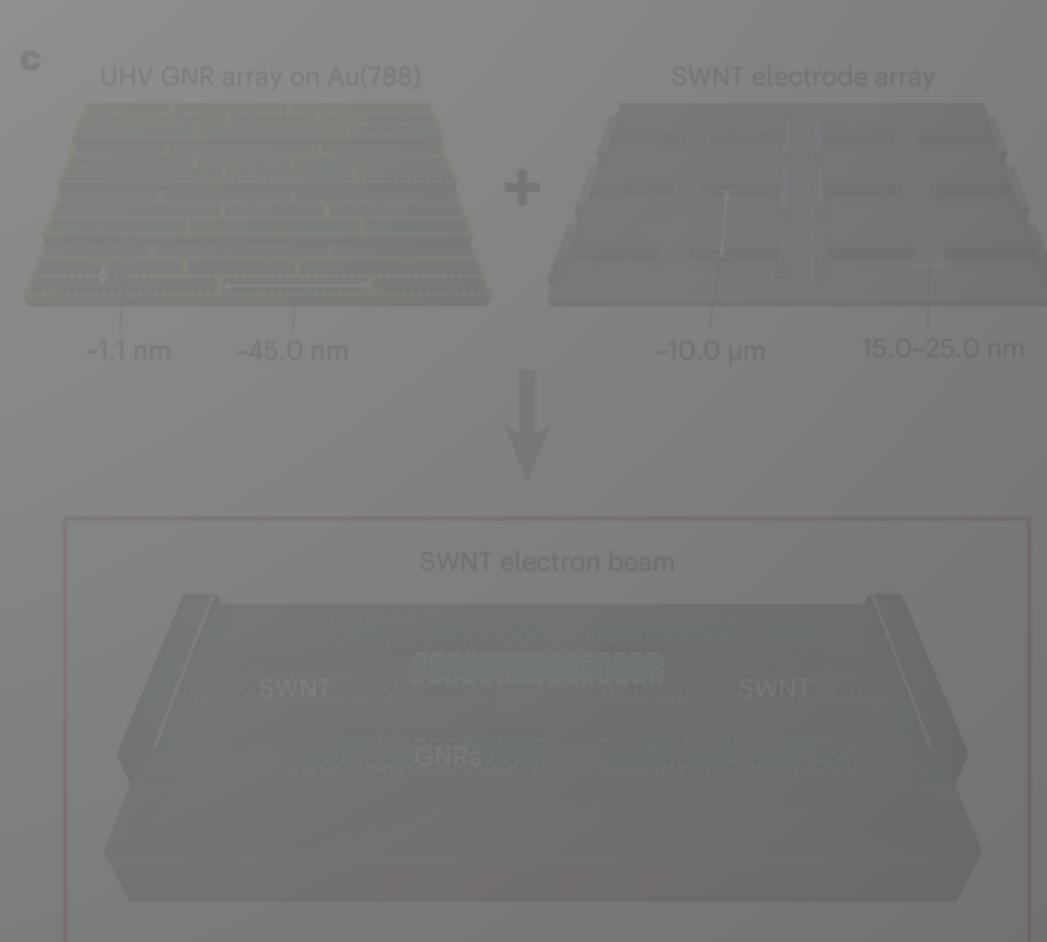
Nanomateriais



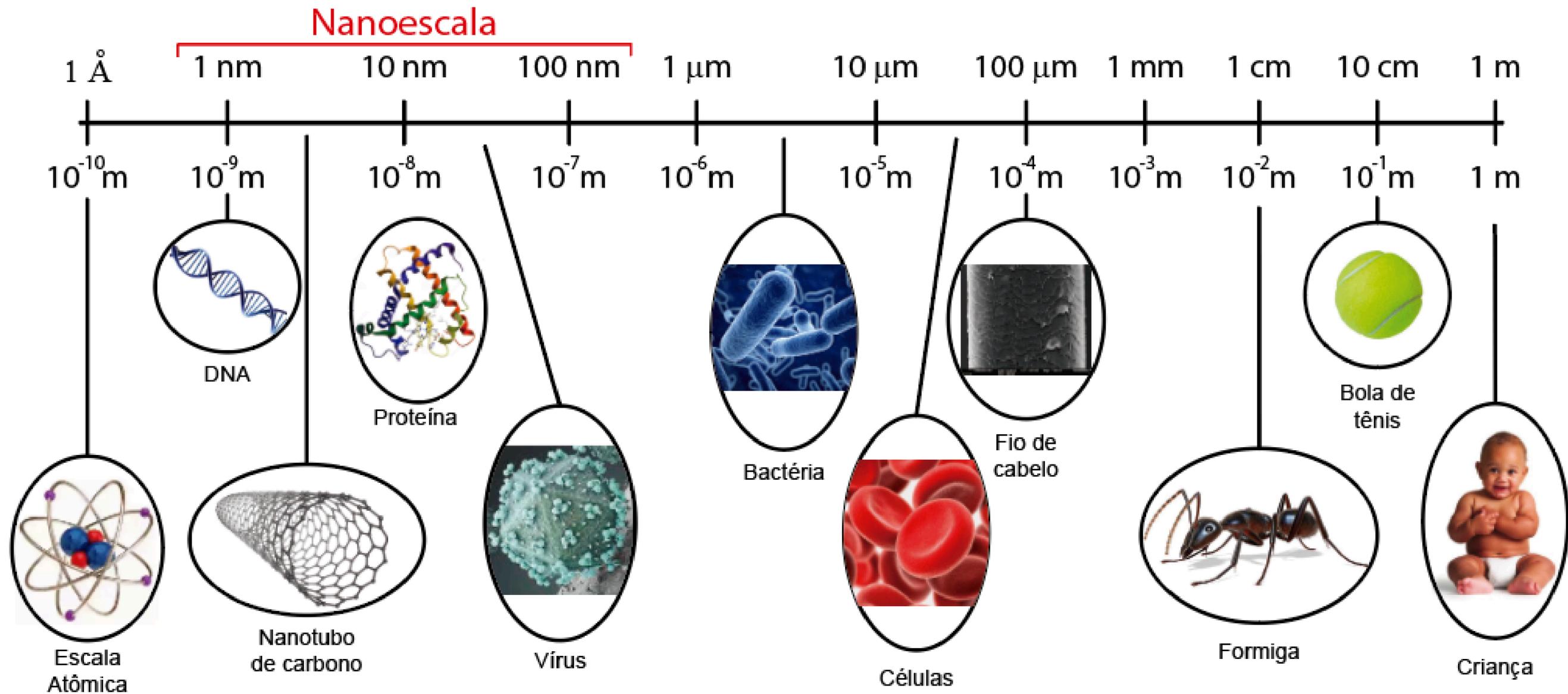
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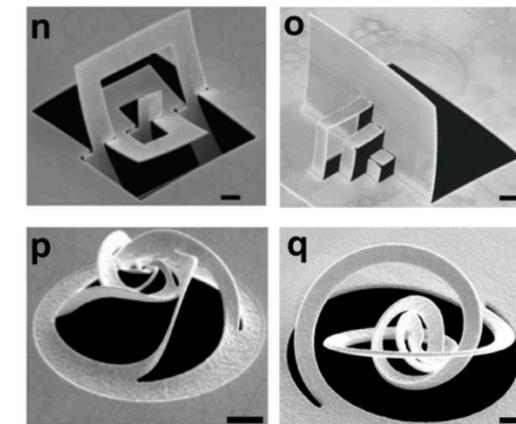
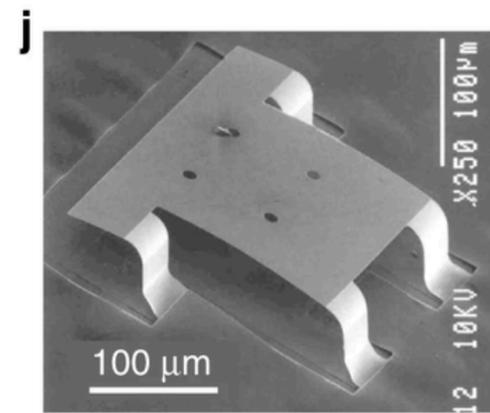
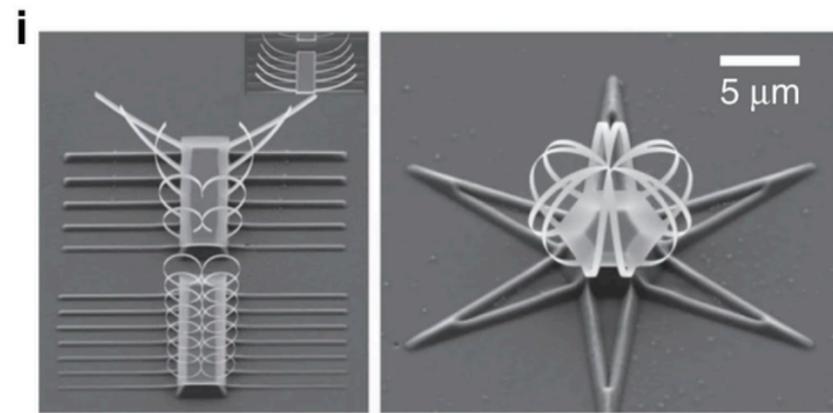
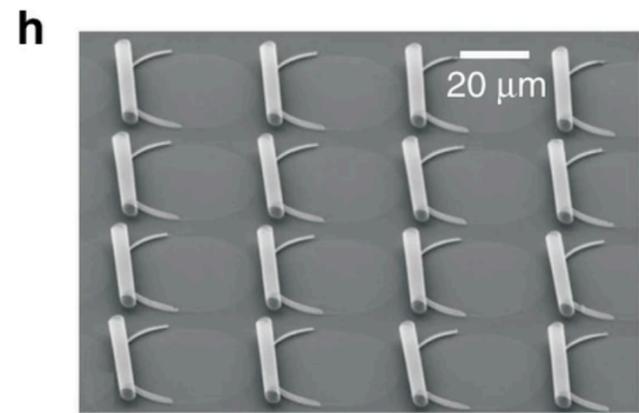
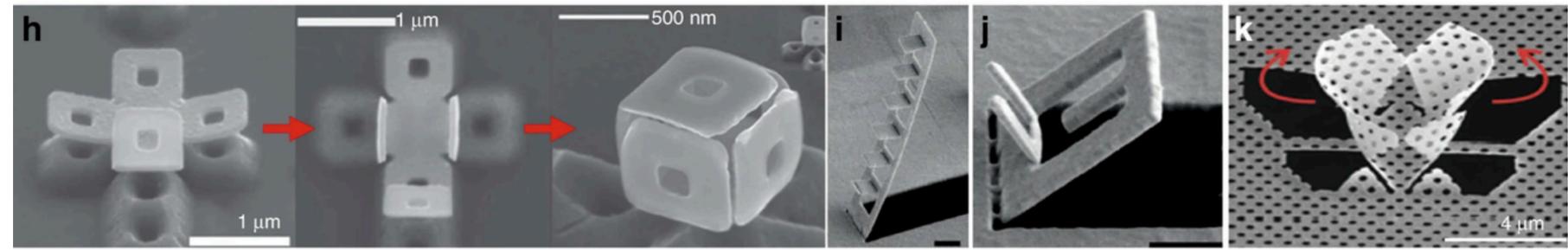
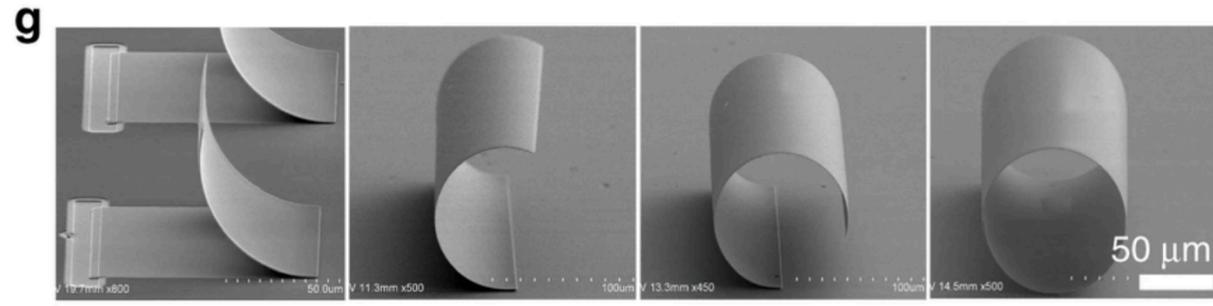
Nanodispositivos

O que é nanotecnologia ?

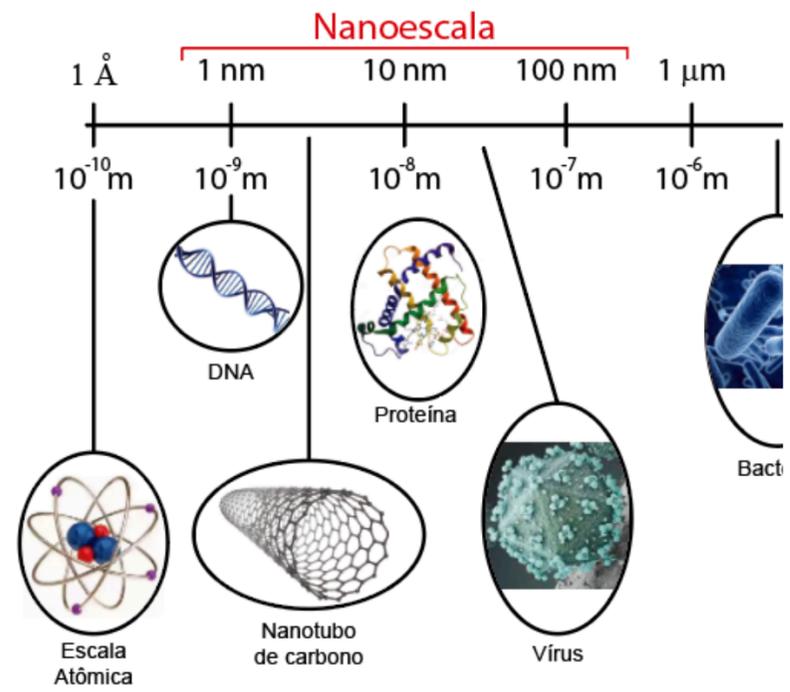


Escala de medida

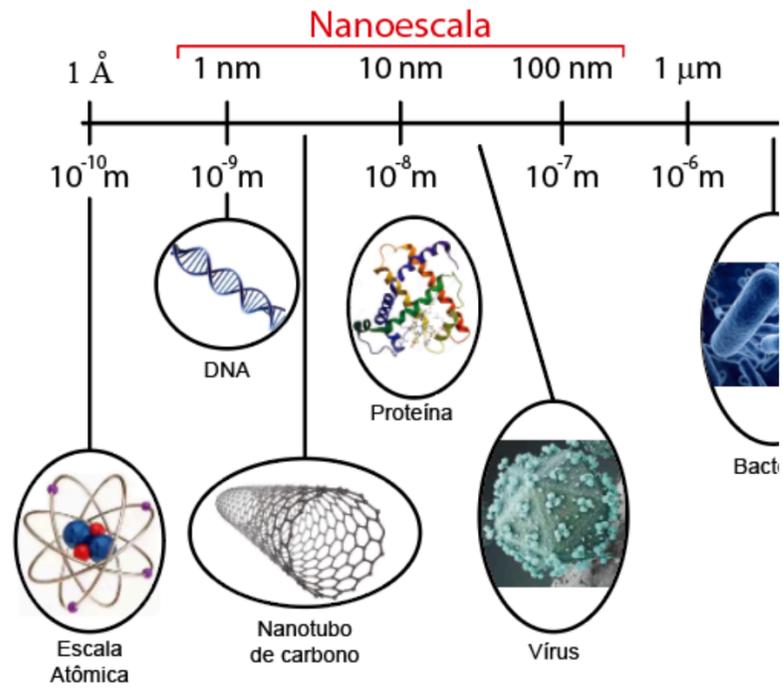




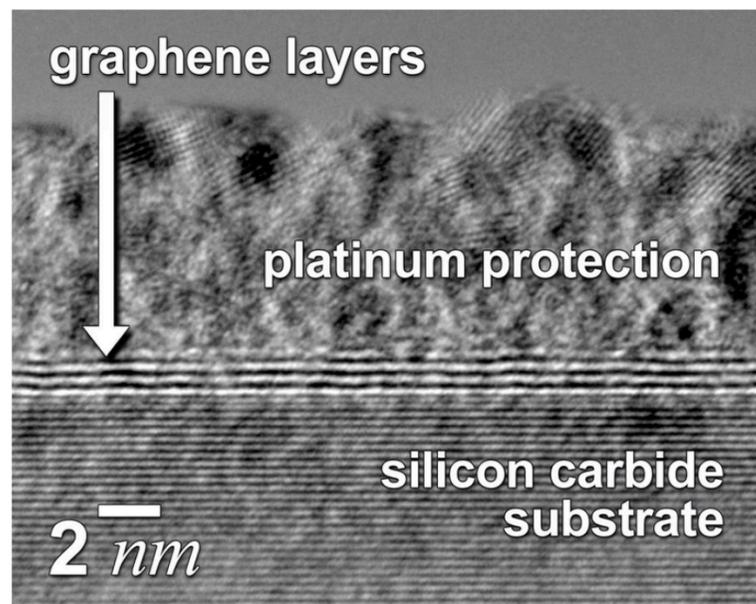
Nanociência



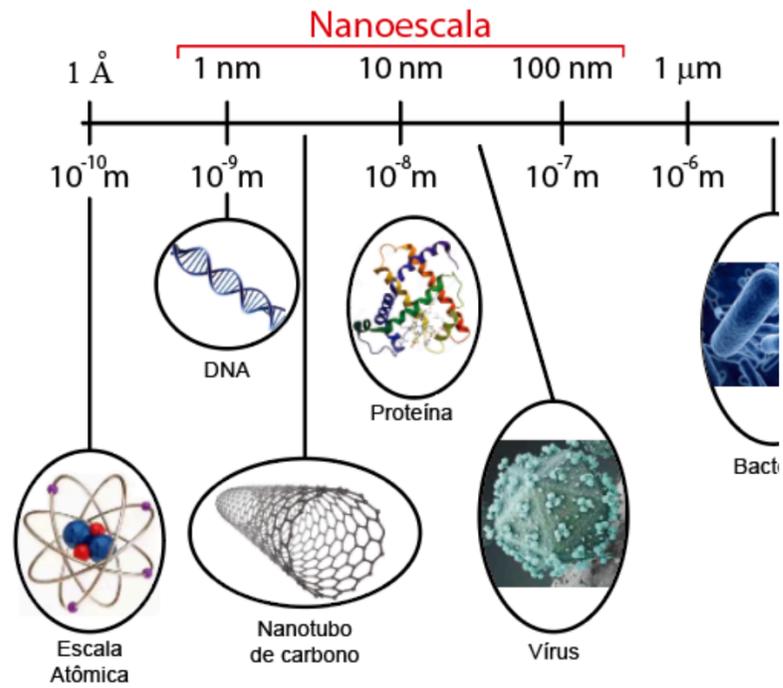
Nanociência



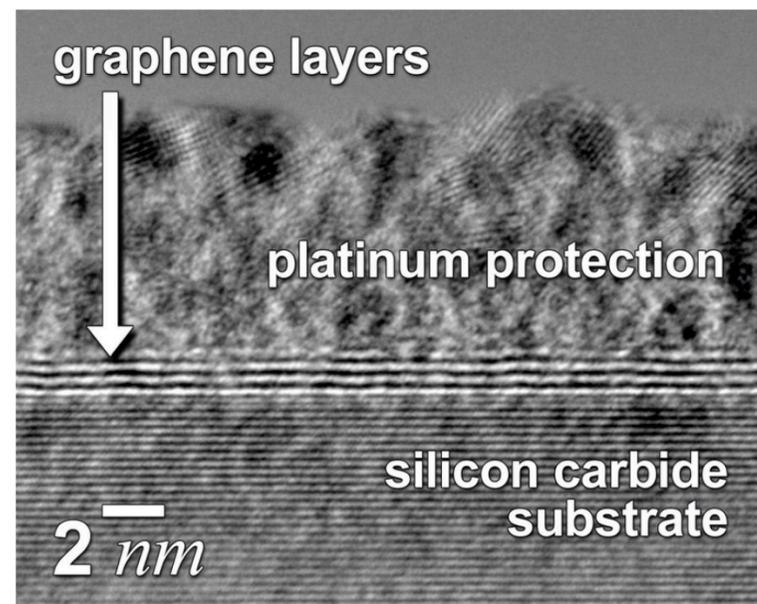
Nanomateriais



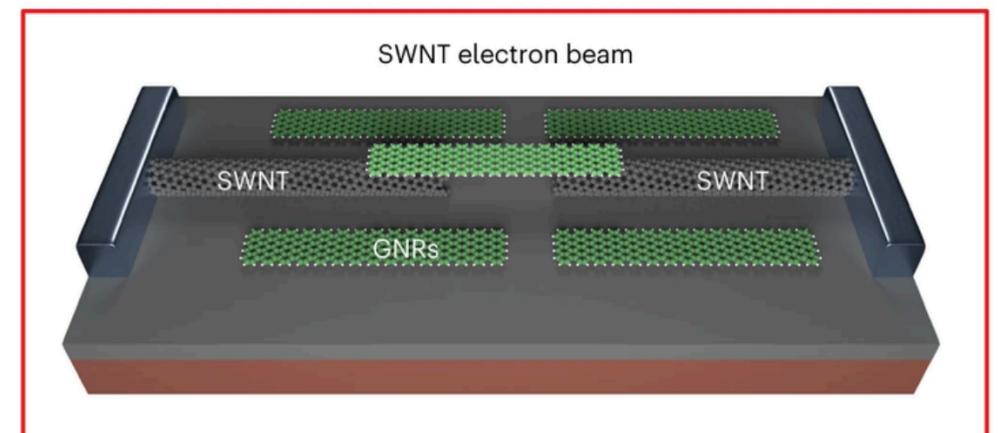
Nanociência



Nanomateriais



Nanodispositivos

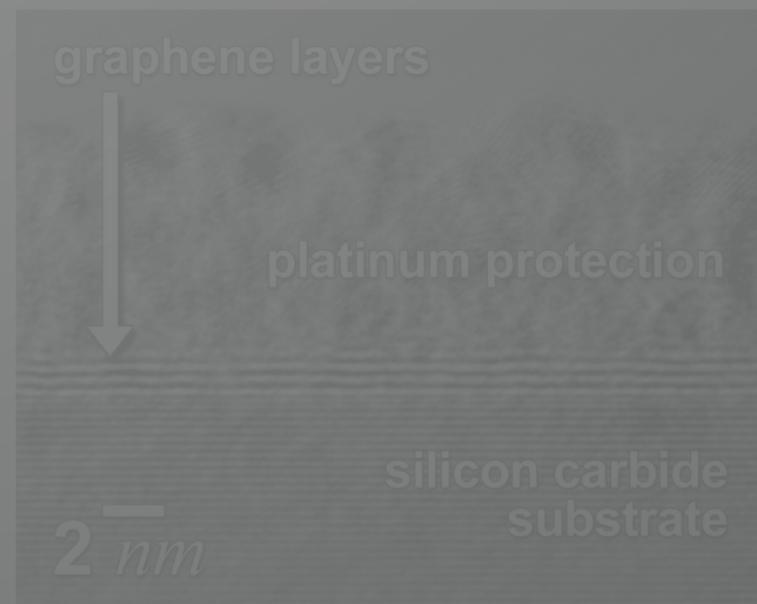


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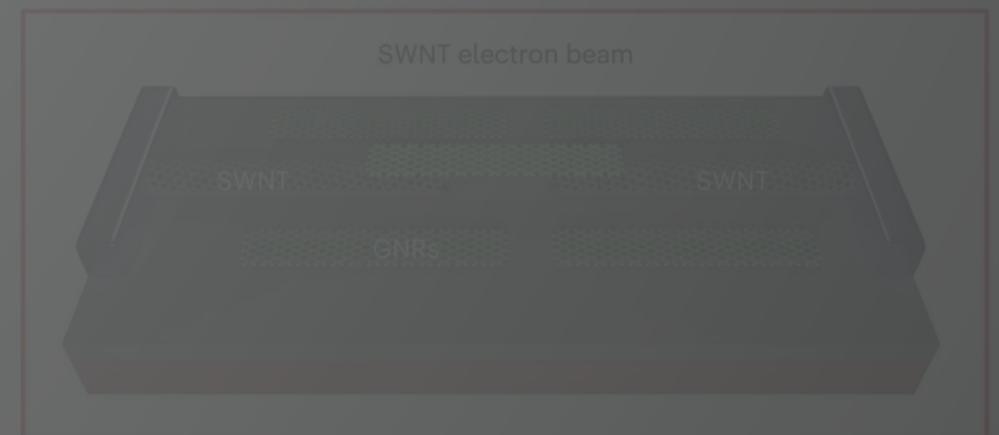
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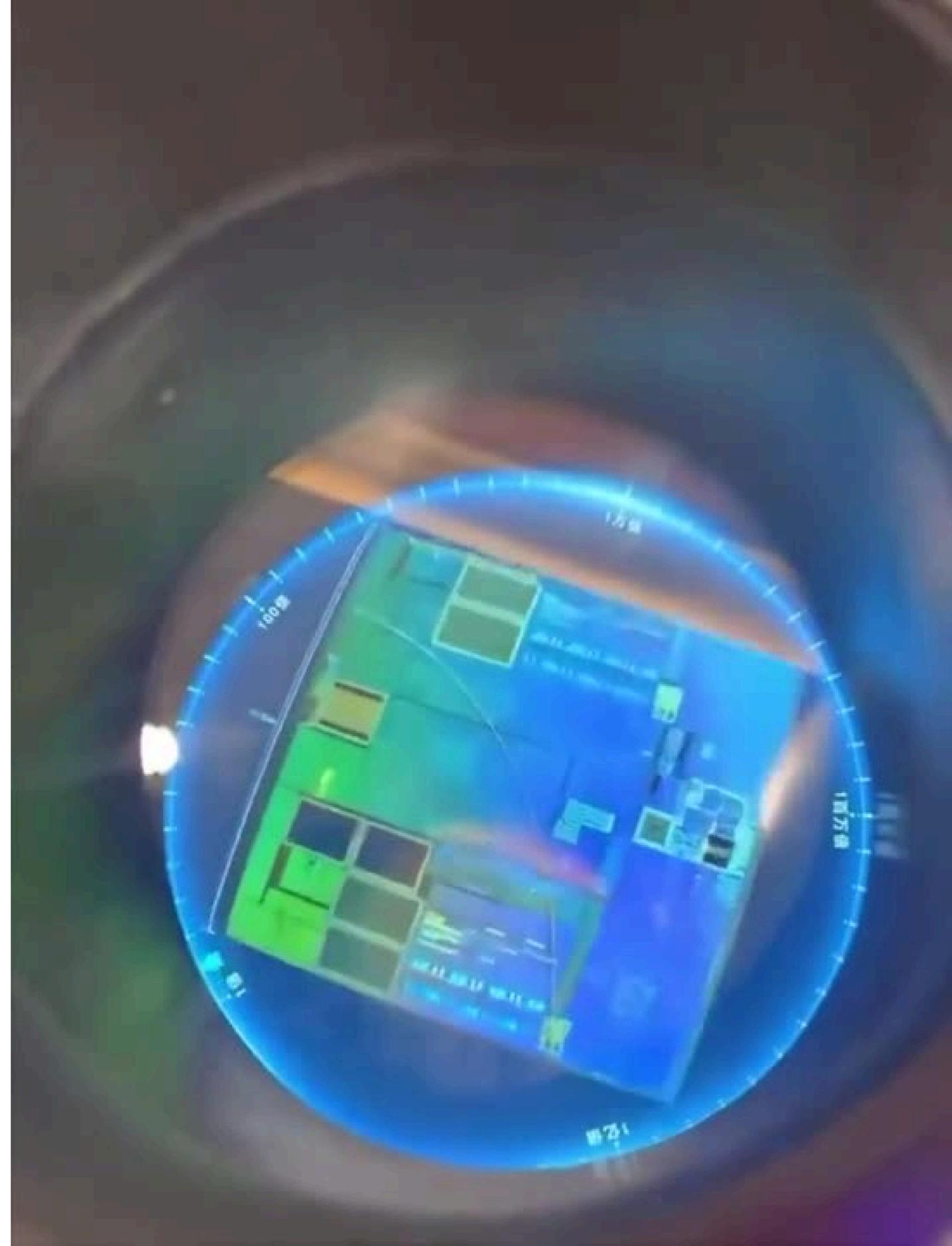


Nanomateriais



Nanodispositivos

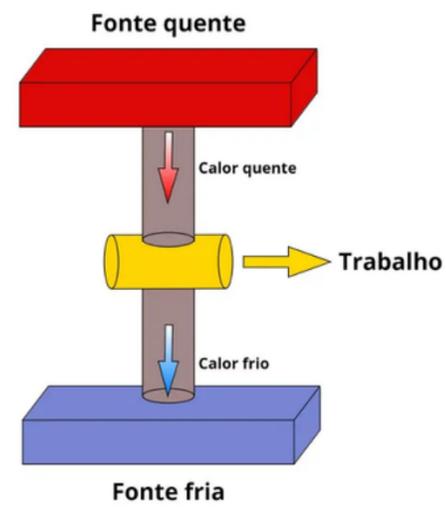




Um pouco de história...

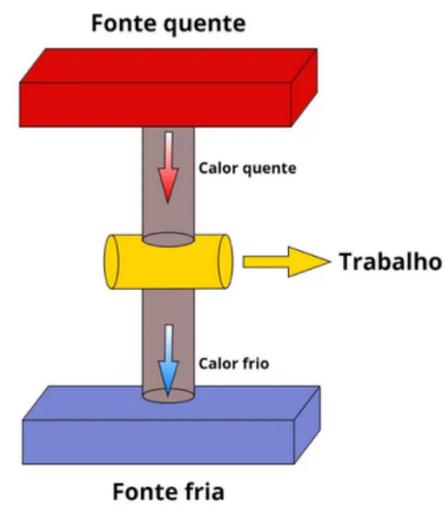
Um pouco de história...

1º revolução industrial



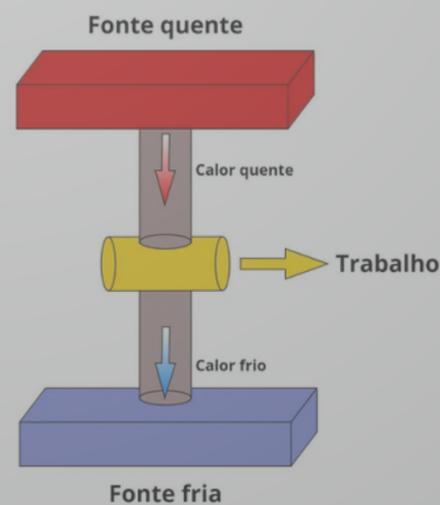
Um pouco de história...

1º revolução industrial

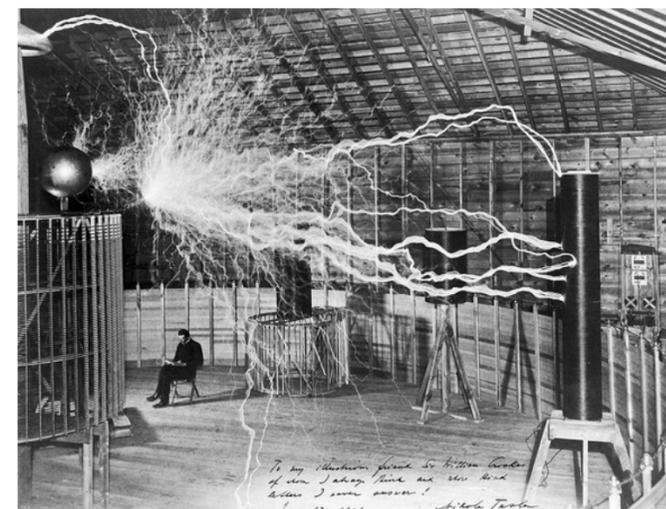


Um pouco de história...

1º revolução industrial

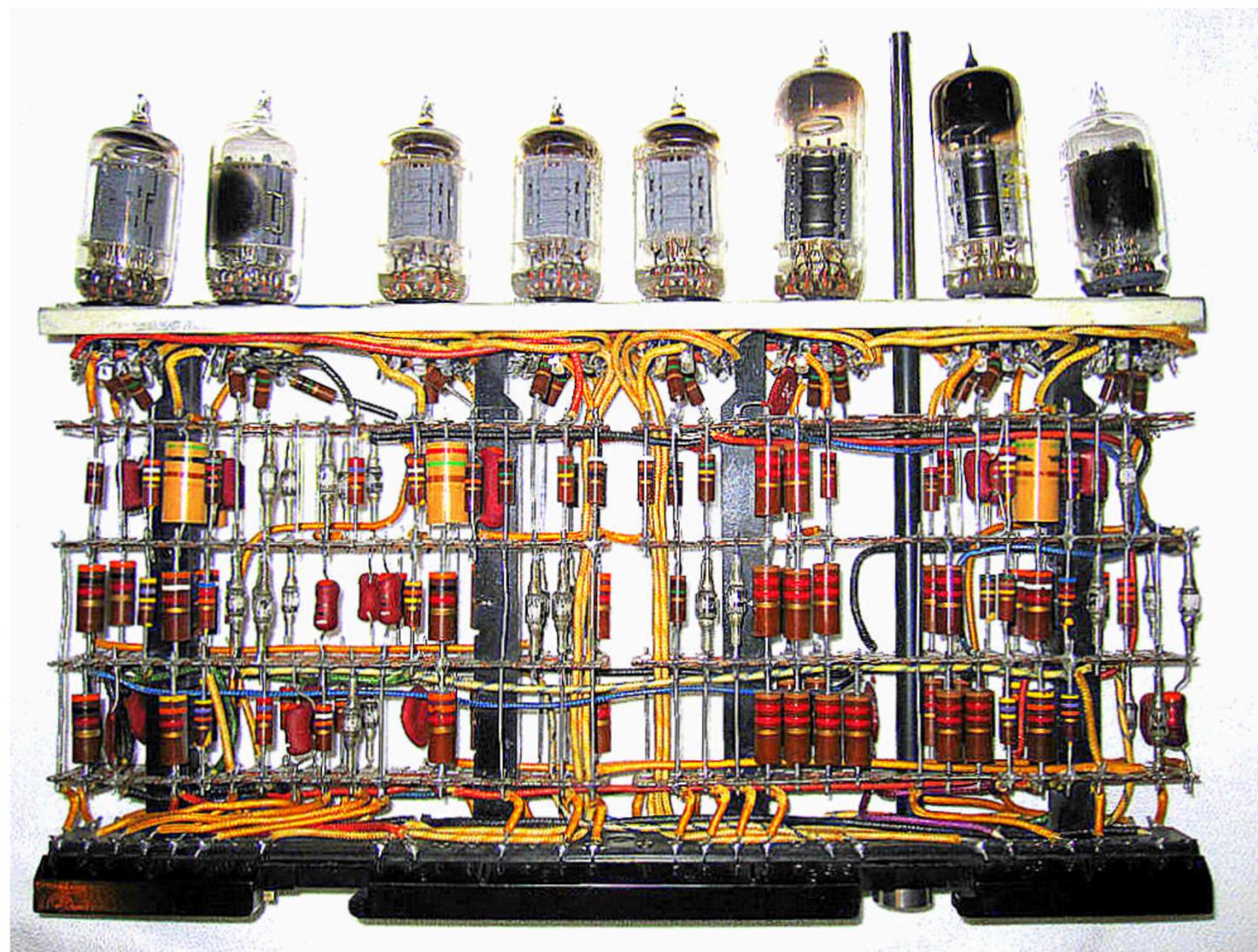


2º revolução industrial



Um pouco de história...

3° revolução industrial



Um pouco de história...

3° revolução industrial



Um pouco de história...

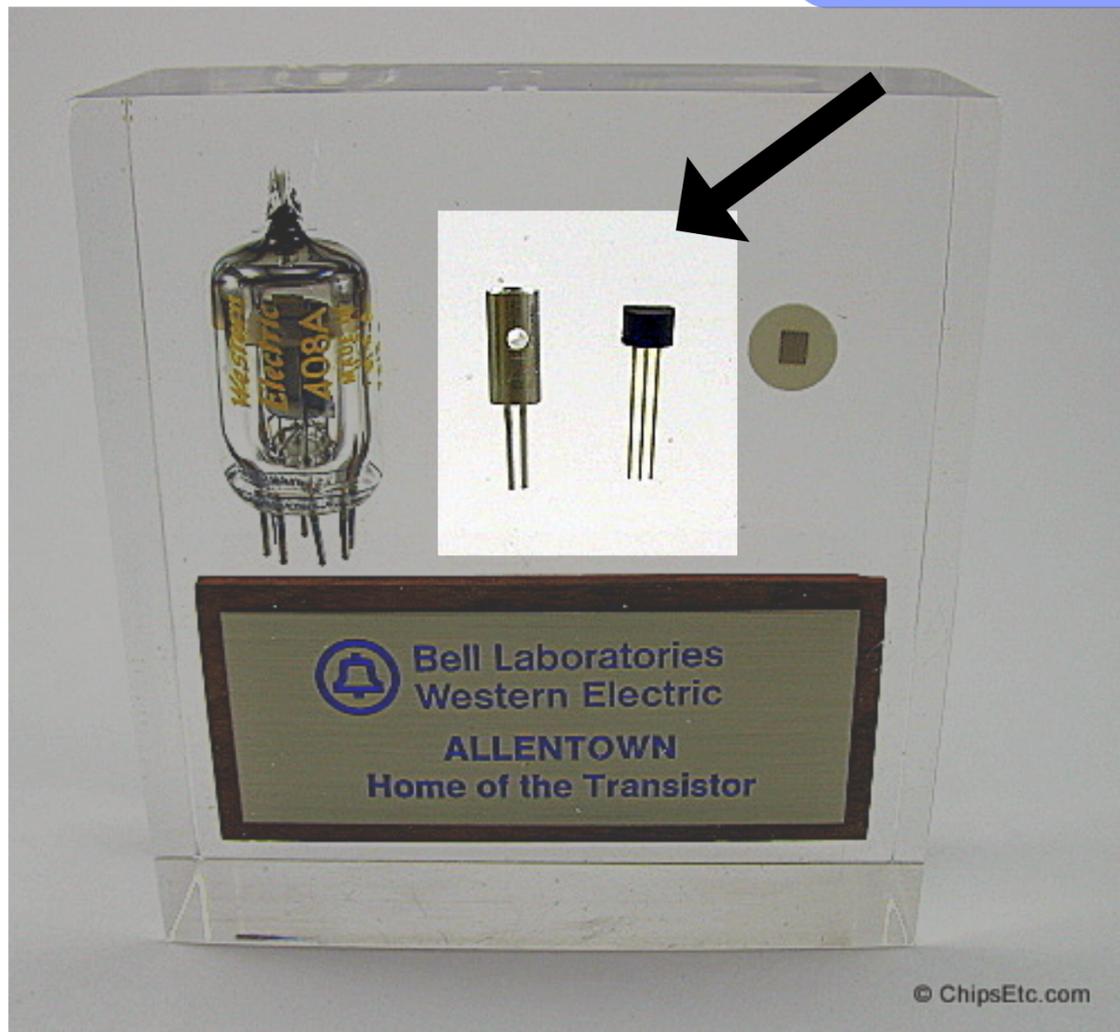
3° revolução industrial



Um pouco de história...

3° revolução industrial

transistor



The Nobel Prize in Physics 1956

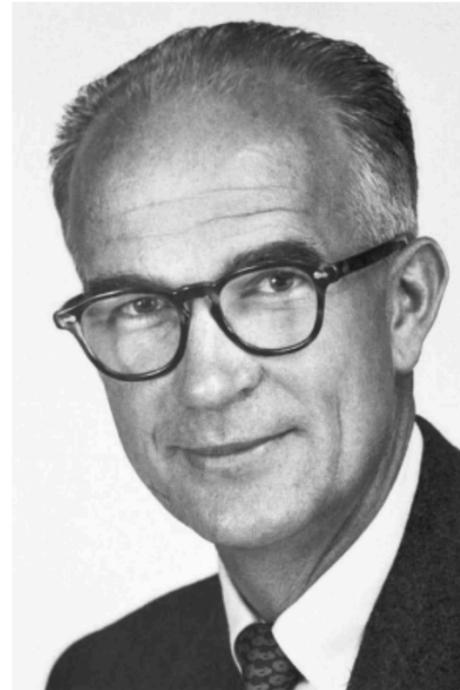


Photo from the Nobel Foundation archive.

William Bradford Shockley

Prize share: 1/3



John Bardeen

Prize share: 1/3



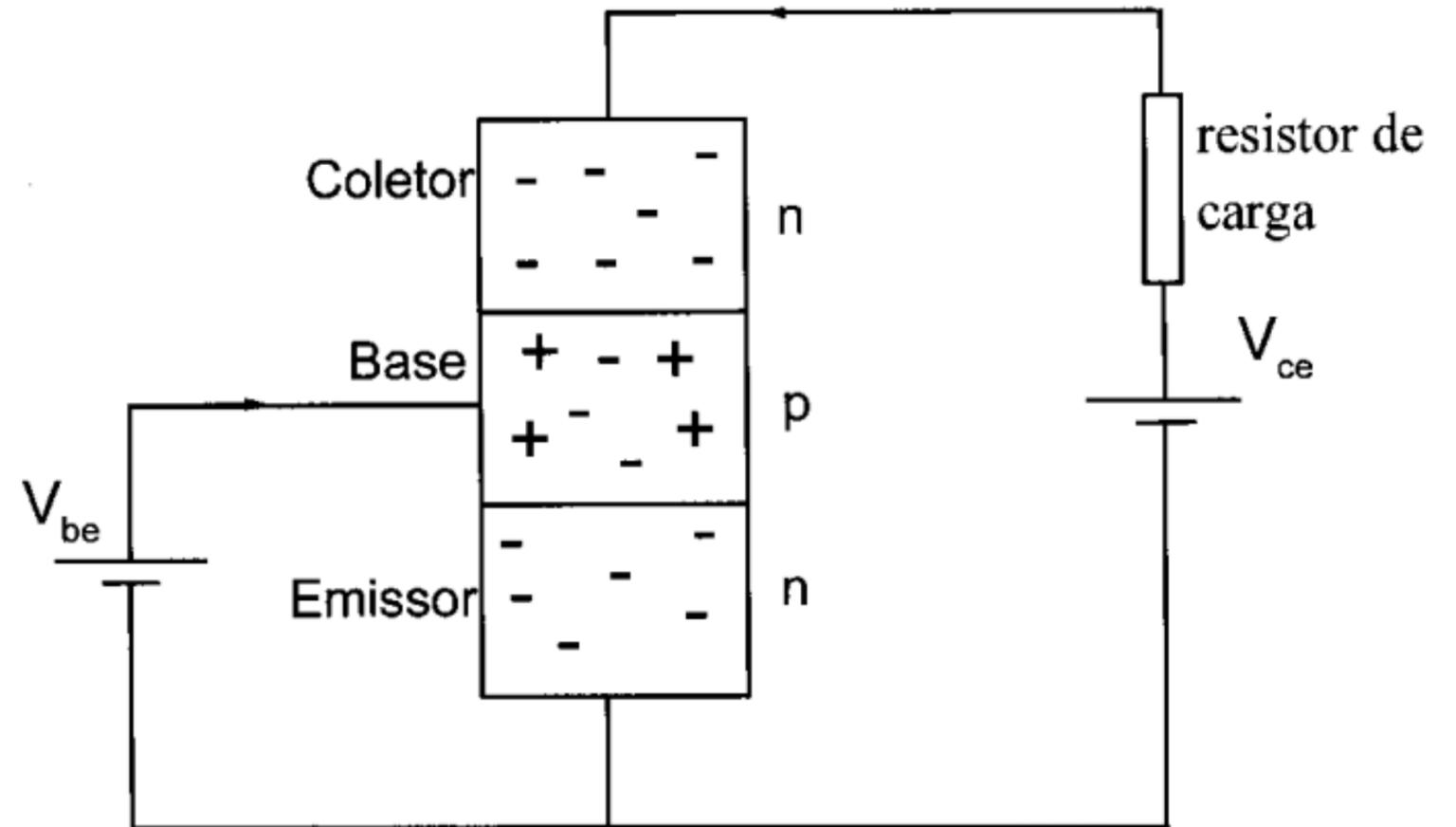
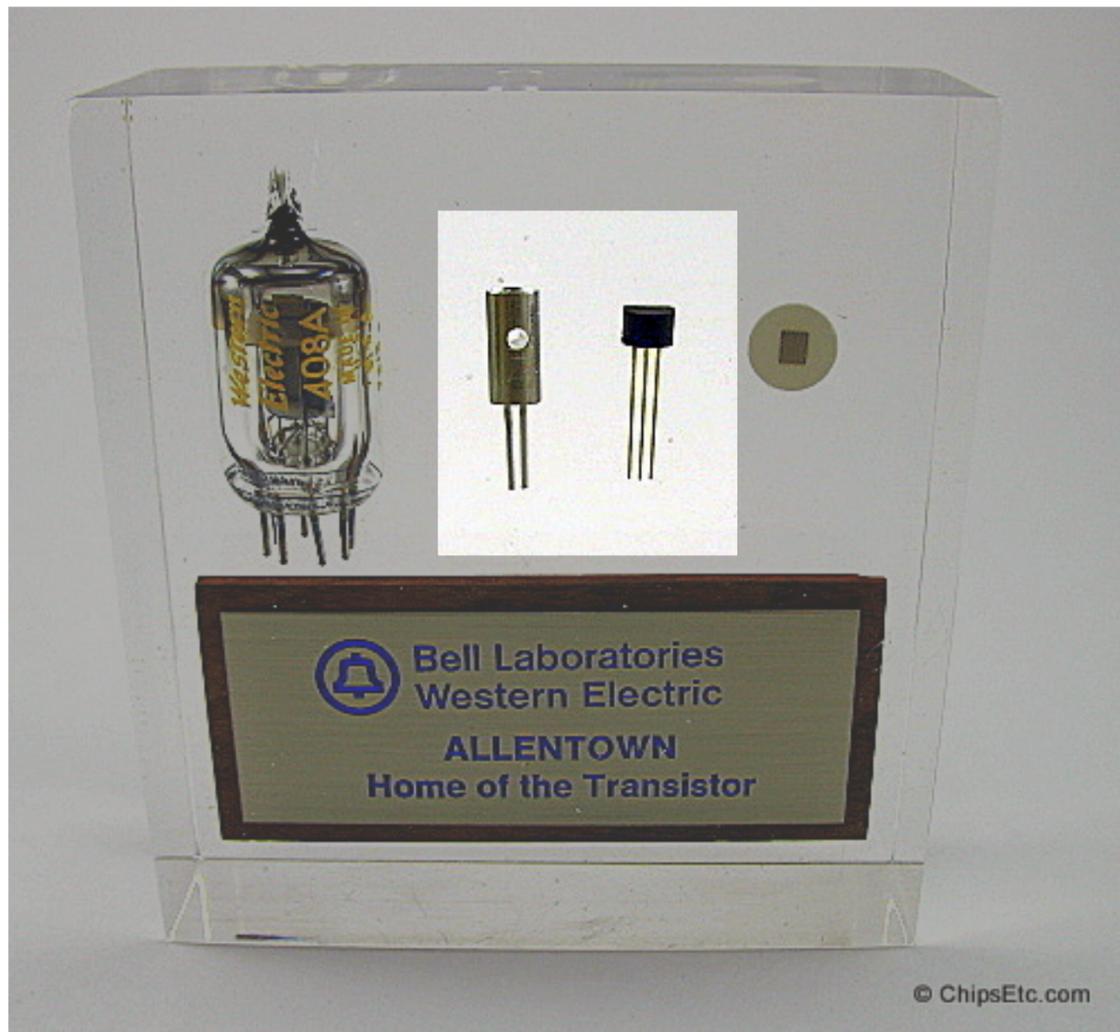
Photo from the Nobel Foundation archive.

Walter Houser Brattain

Prize share: 1/3

Um pouco de história...

3° revolução industrial



Um pouco de história...

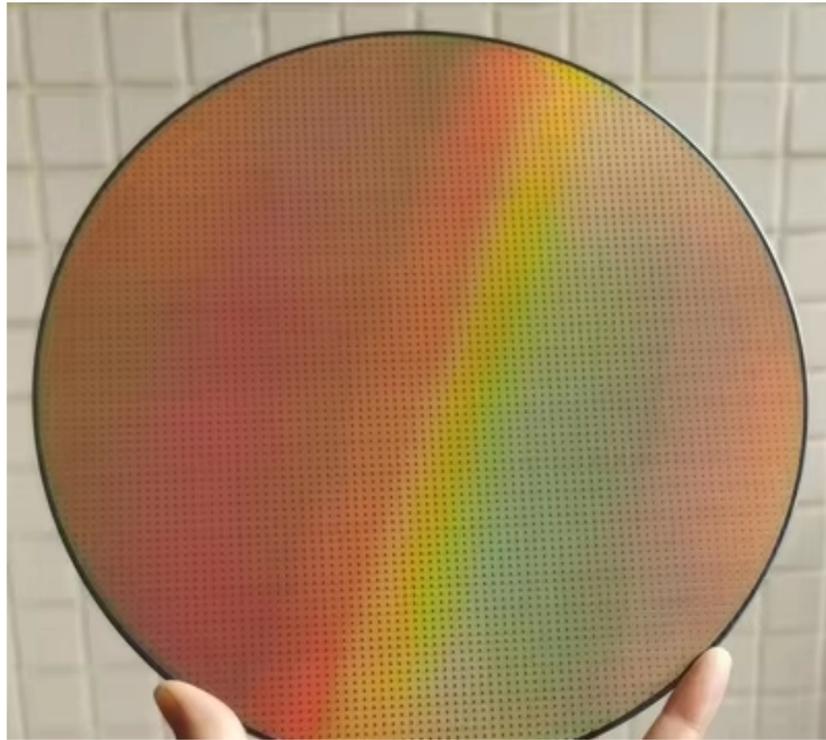
3° revolução industrial



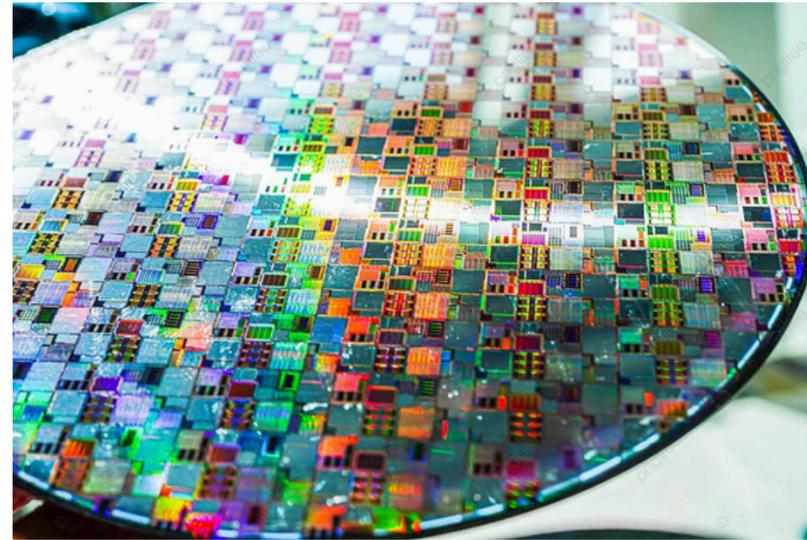
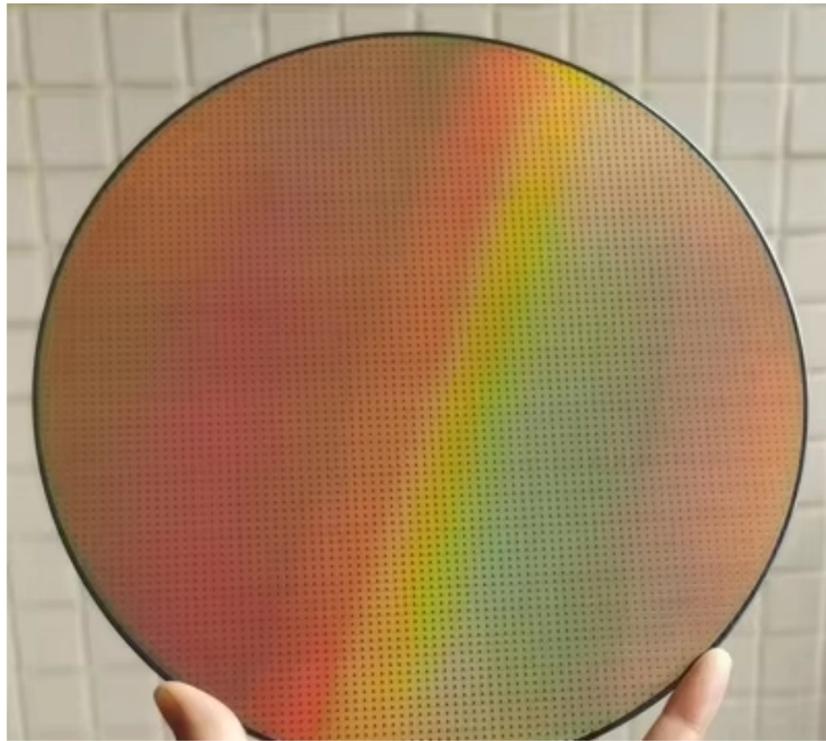
Um pouco de história...

4° revolução industrial?

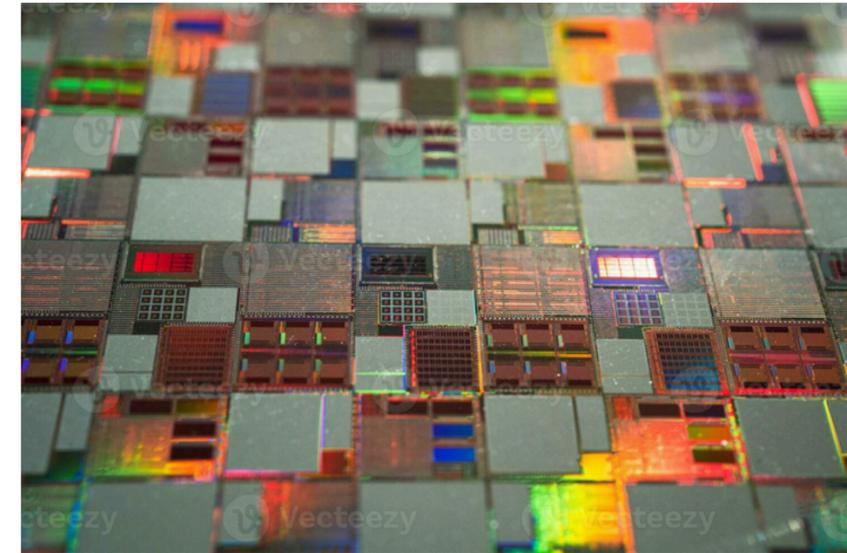
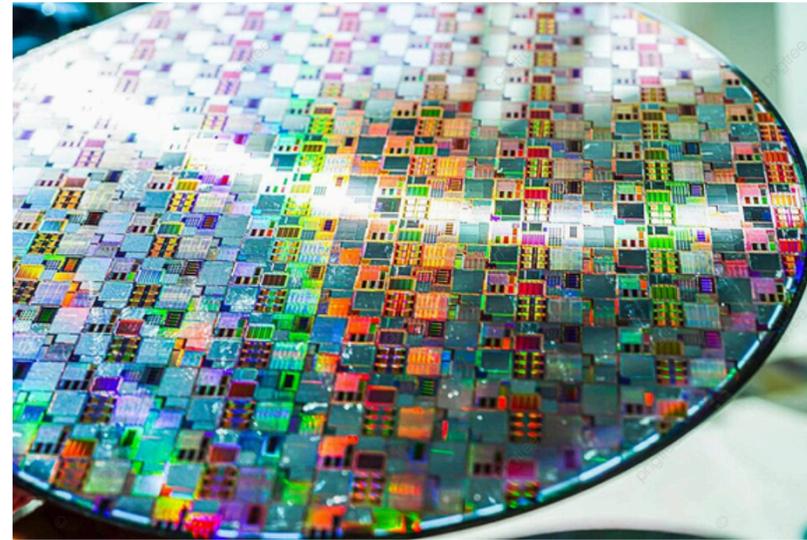
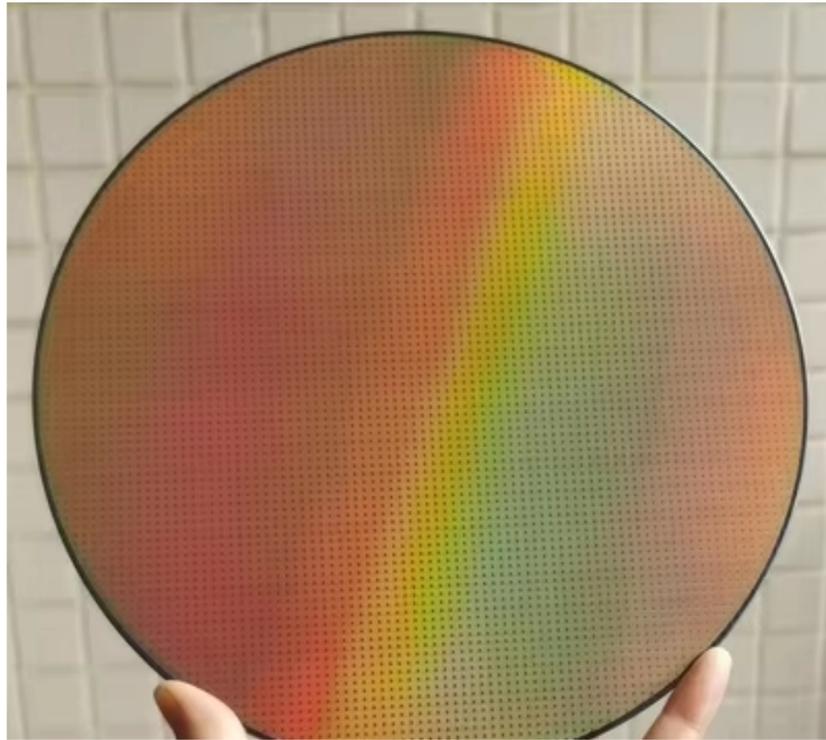
Lei de Moore



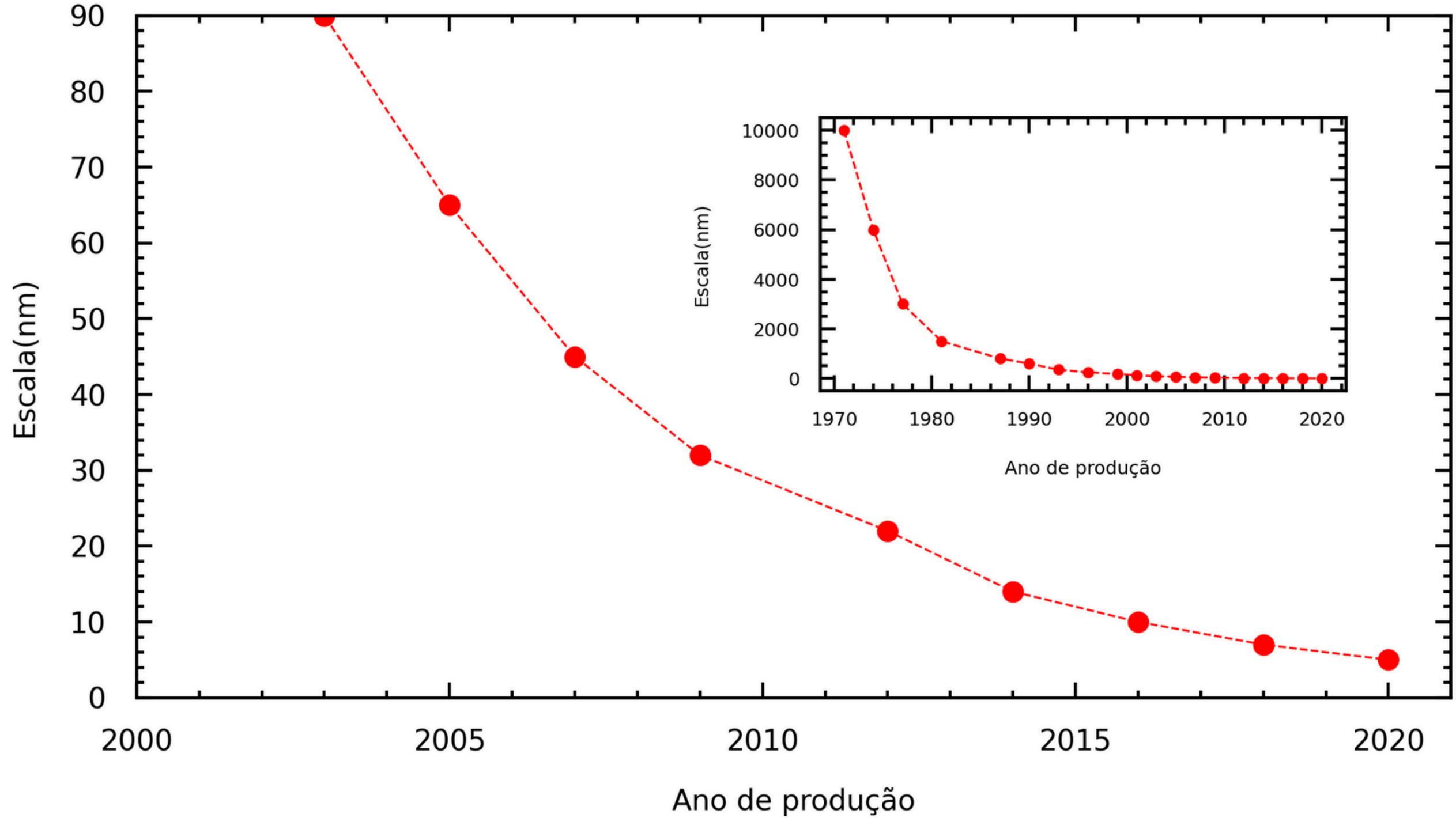
Lei de Moore



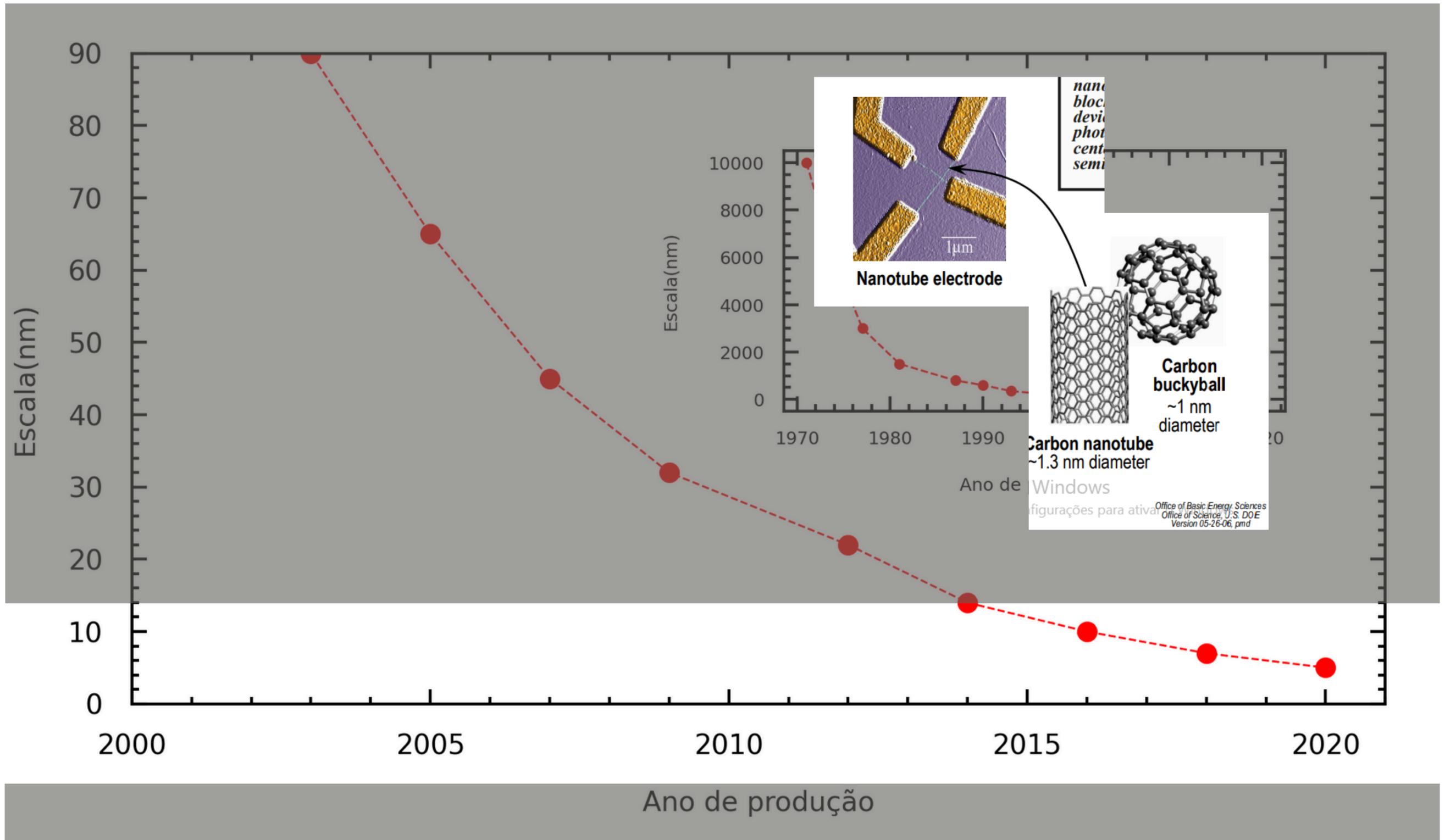
Lei de Moore



Lei de Moore



Lei de Moore



Mecânica Clássica

Mecânica Quântica

Mecânica Clássica

$$\vec{F} = m \frac{d\vec{v}}{dt} = m\vec{a}$$

Mecânica Quântica

Mecânica Clássica

Mecânica Quântica

$$\vec{F} = m \frac{d\vec{v}}{dt} = m\vec{a}$$

Movimento de uma partícula livre

$$\vec{x}(t) = \vec{x}_0 + \vec{v}_0 t$$

Mecânica Clássica

$$\vec{F} = m \frac{d\vec{v}}{dt} = m\vec{a}$$

Movimento de uma partícula livre

$$\vec{x}(t) = \vec{x}_0 + \vec{v}_0 t$$

Mecânica Quântica

$$-\frac{\hbar^2}{2m} \frac{d^2\psi(x)}{dx^2} = E\psi(x)$$

Mecânica Clássica

$$\vec{F} = m \frac{d\vec{v}}{dt} = m\vec{a}$$

Movimento de uma partícula livre

$$\vec{x}(t) = \vec{x}_0 + \vec{v}_0 t$$

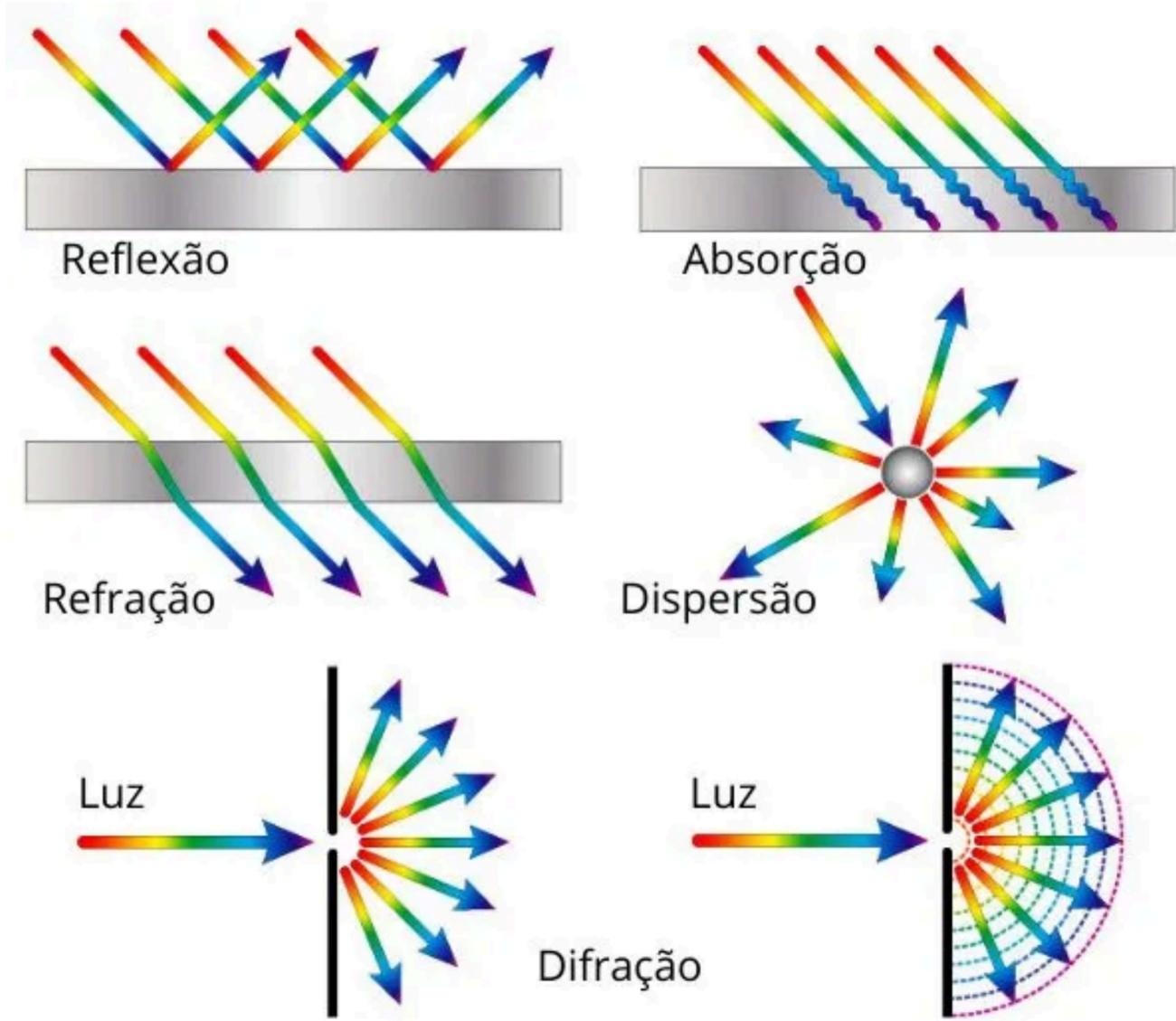
Mecânica Quântica

$$-\frac{\hbar^2}{2m} \frac{d^2\psi(x)}{dx^2} = E\psi(x)$$

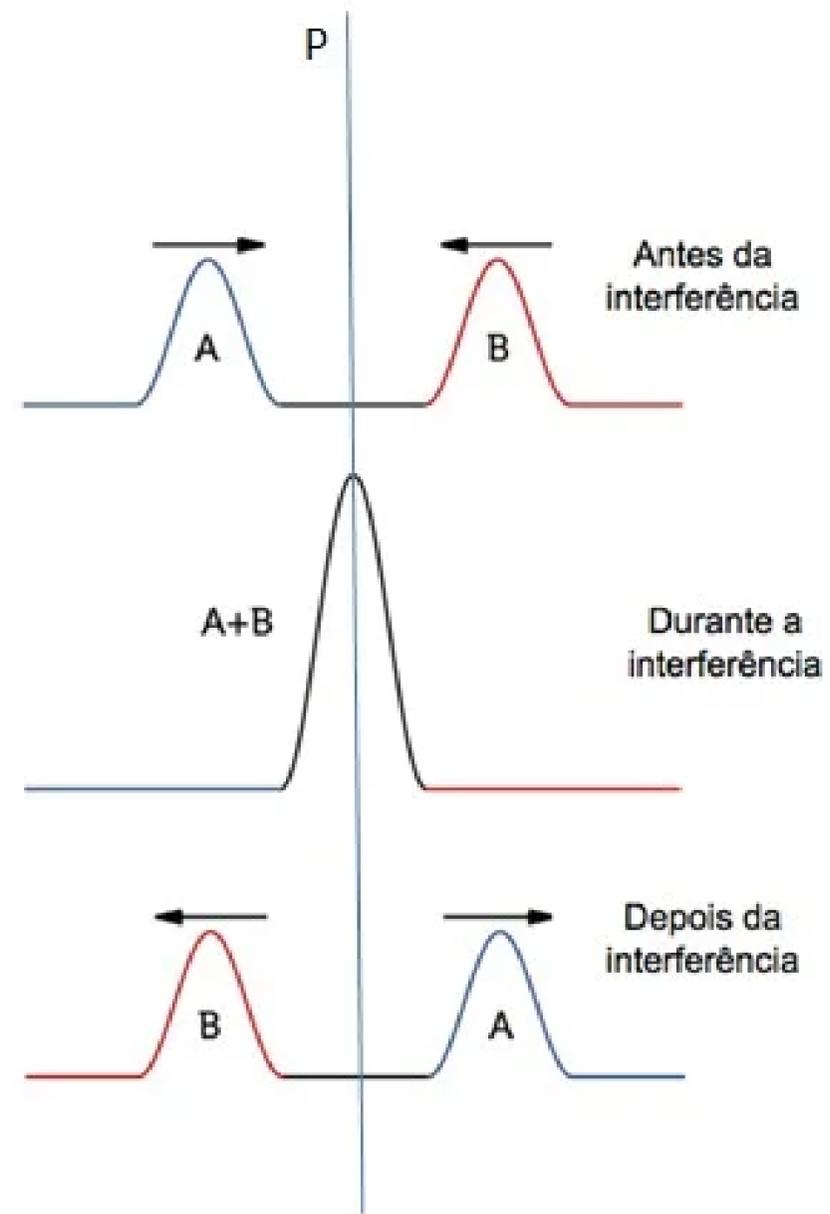
Movimento de uma partícula livre

$$\psi(x) = Ae^{ikx} + Be^{-ikx}$$

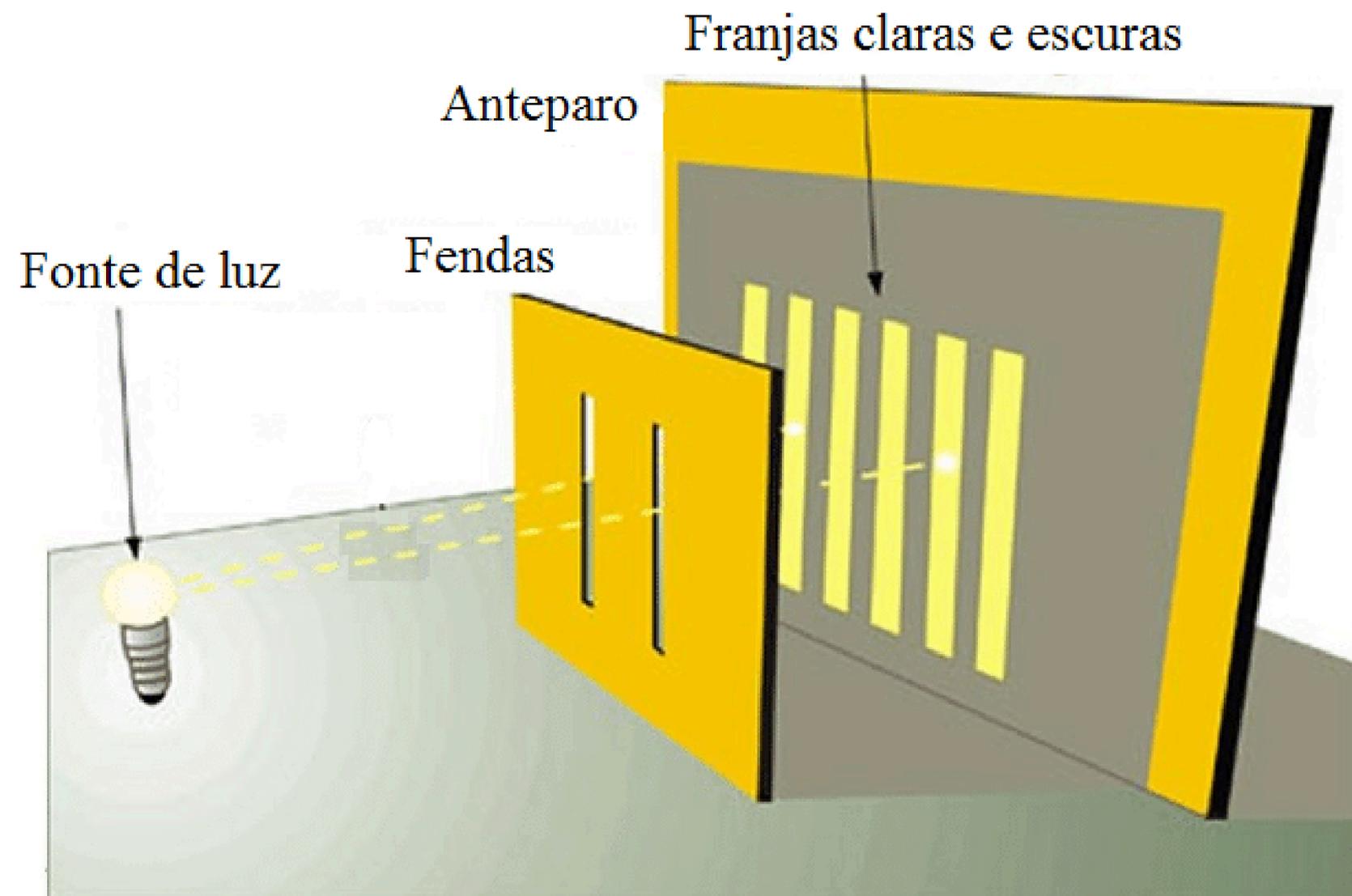
Ondulatória



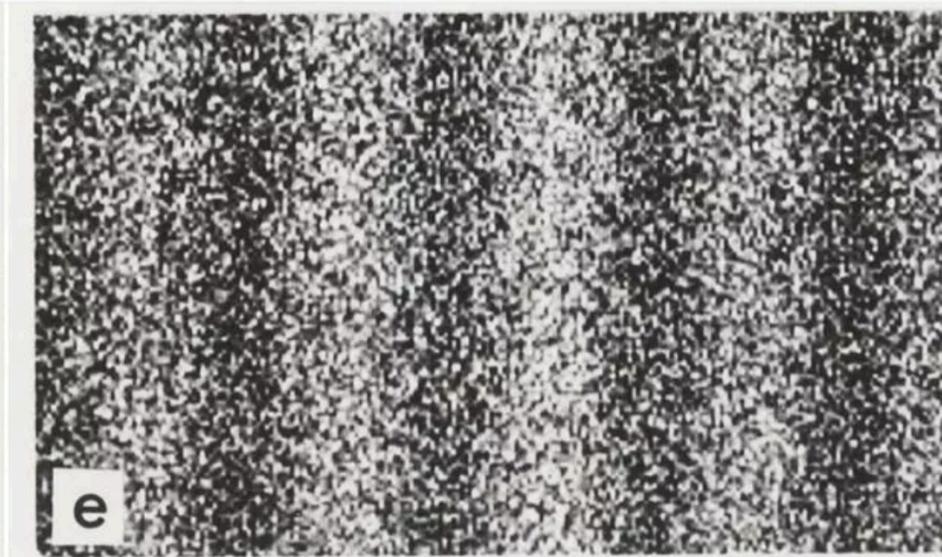
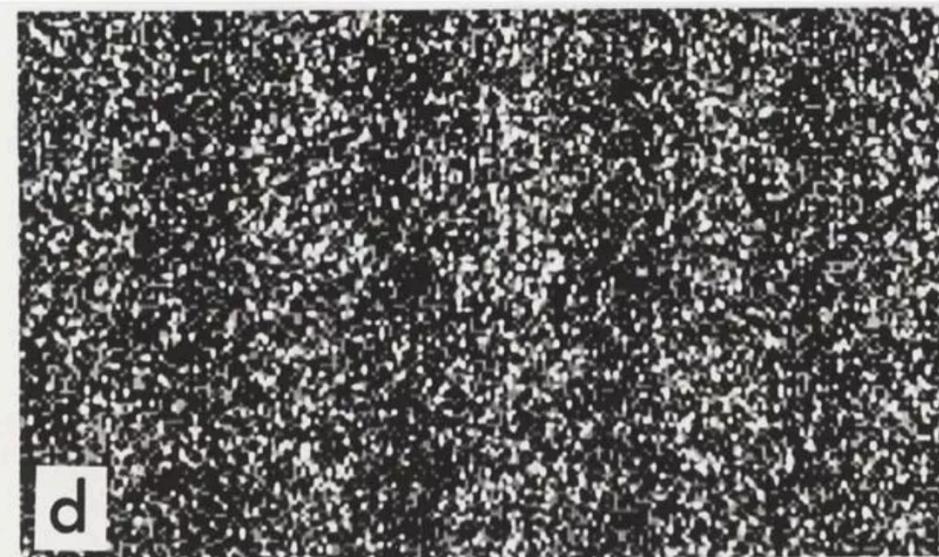
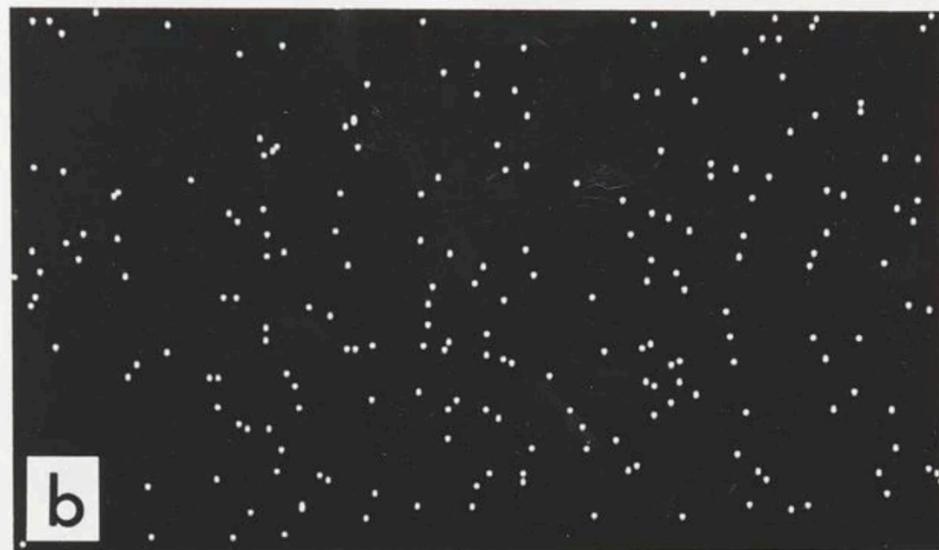
Ondulatória



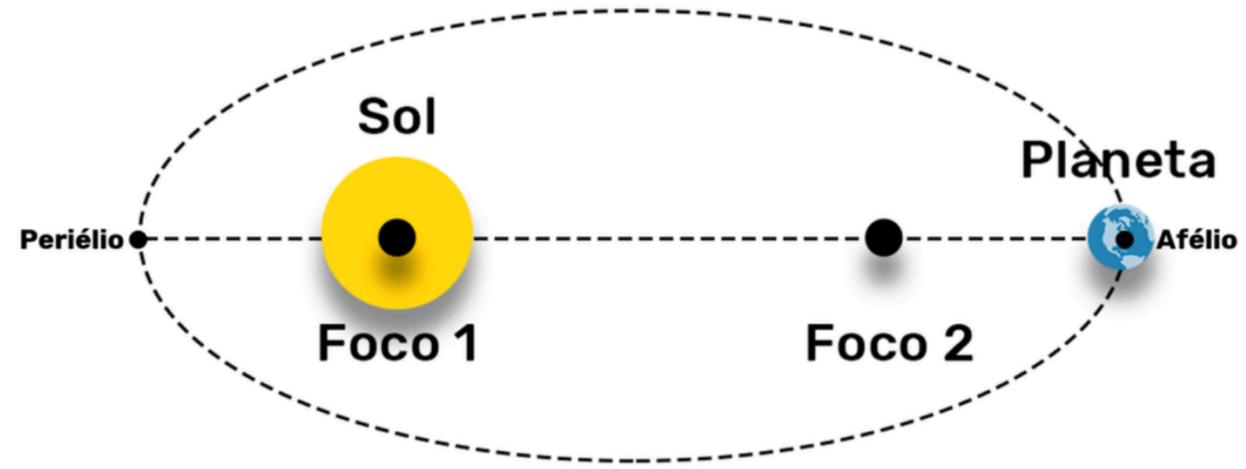
Dupla fenda



Dupla fenda

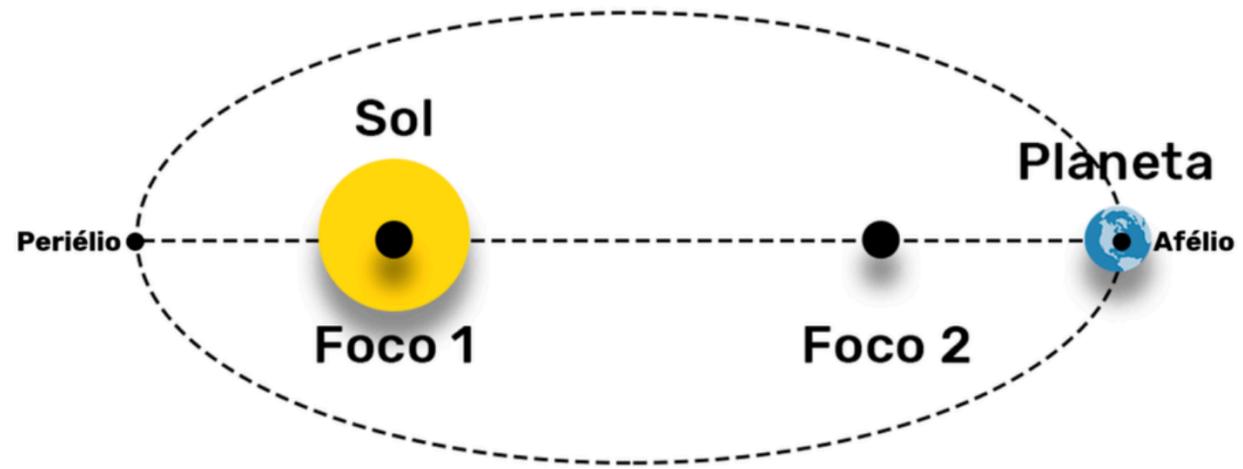


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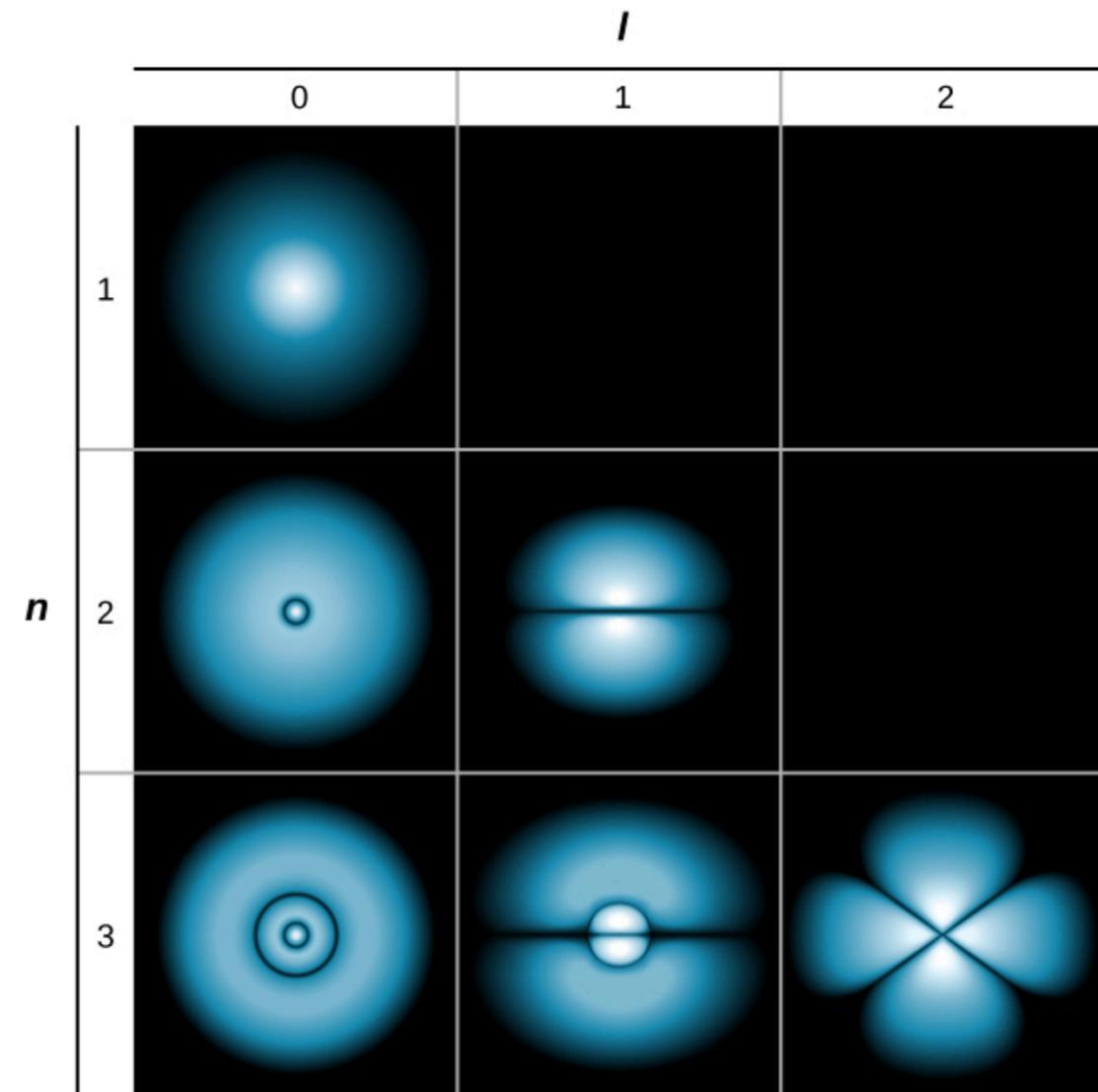


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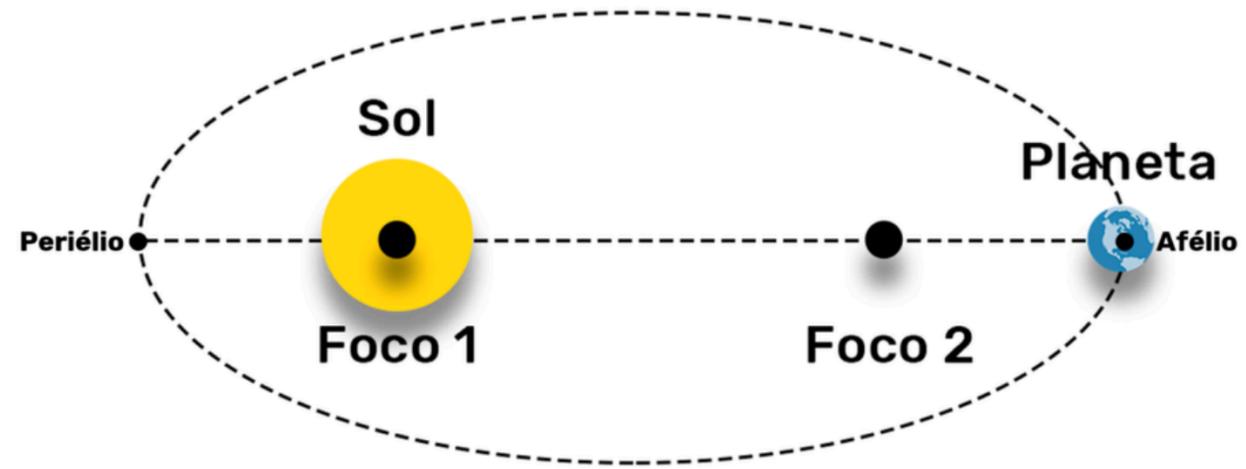
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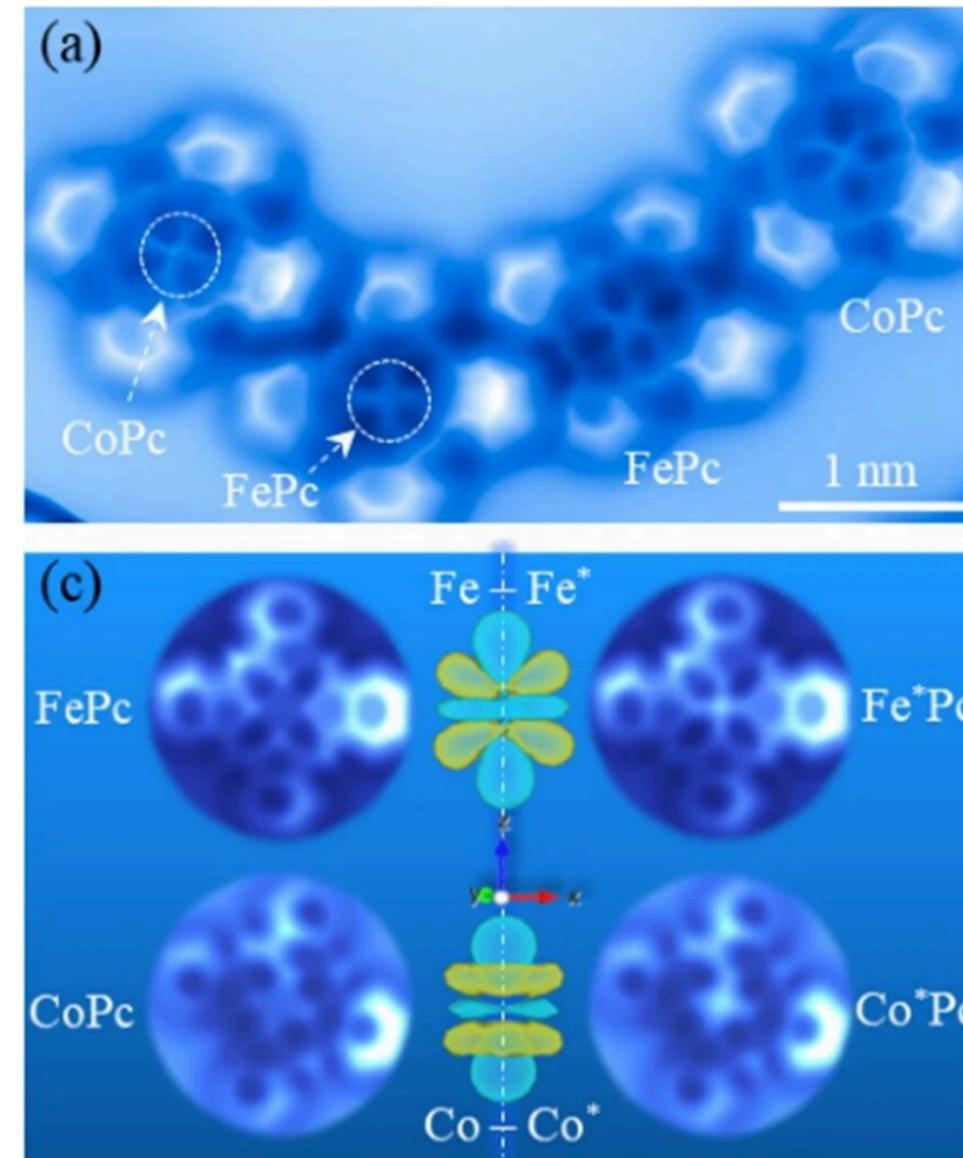
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Mecânica Clássica

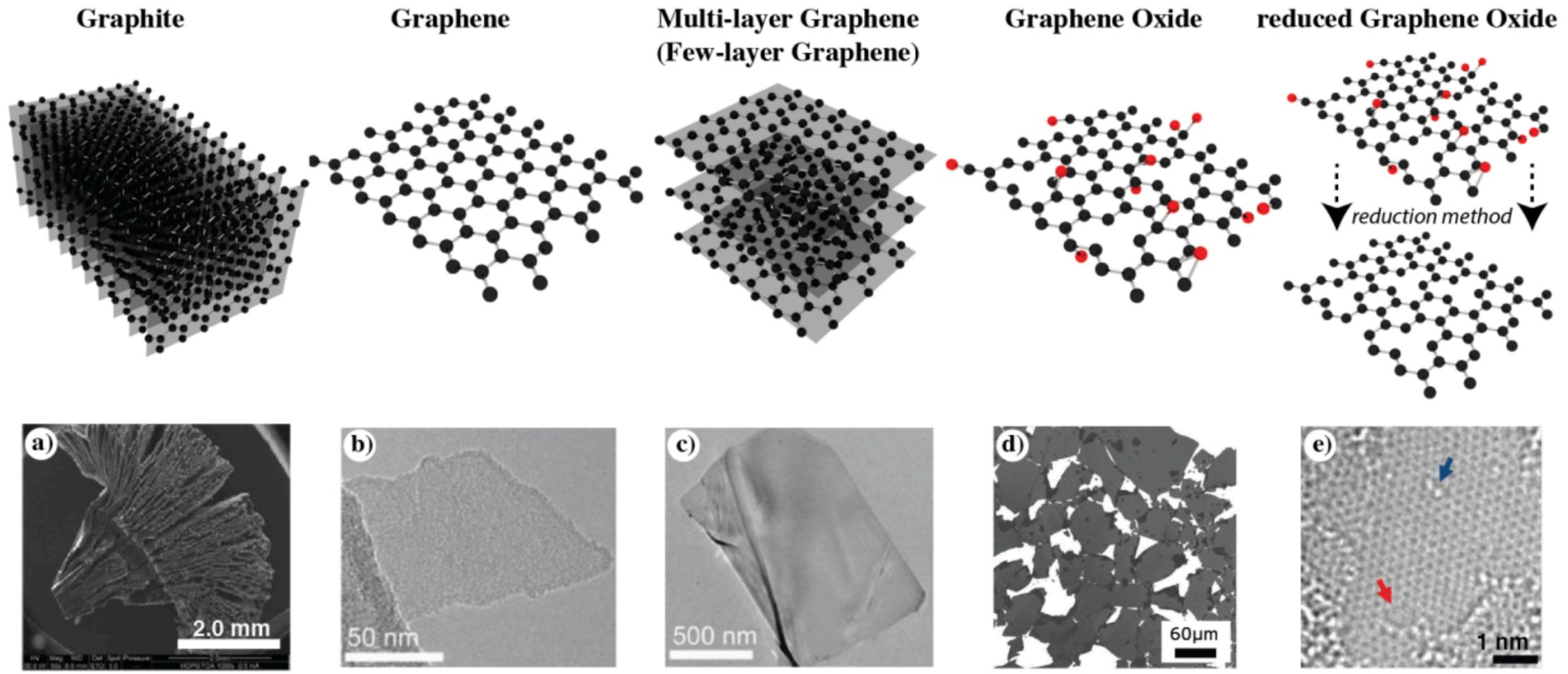


Mecânica Quântica



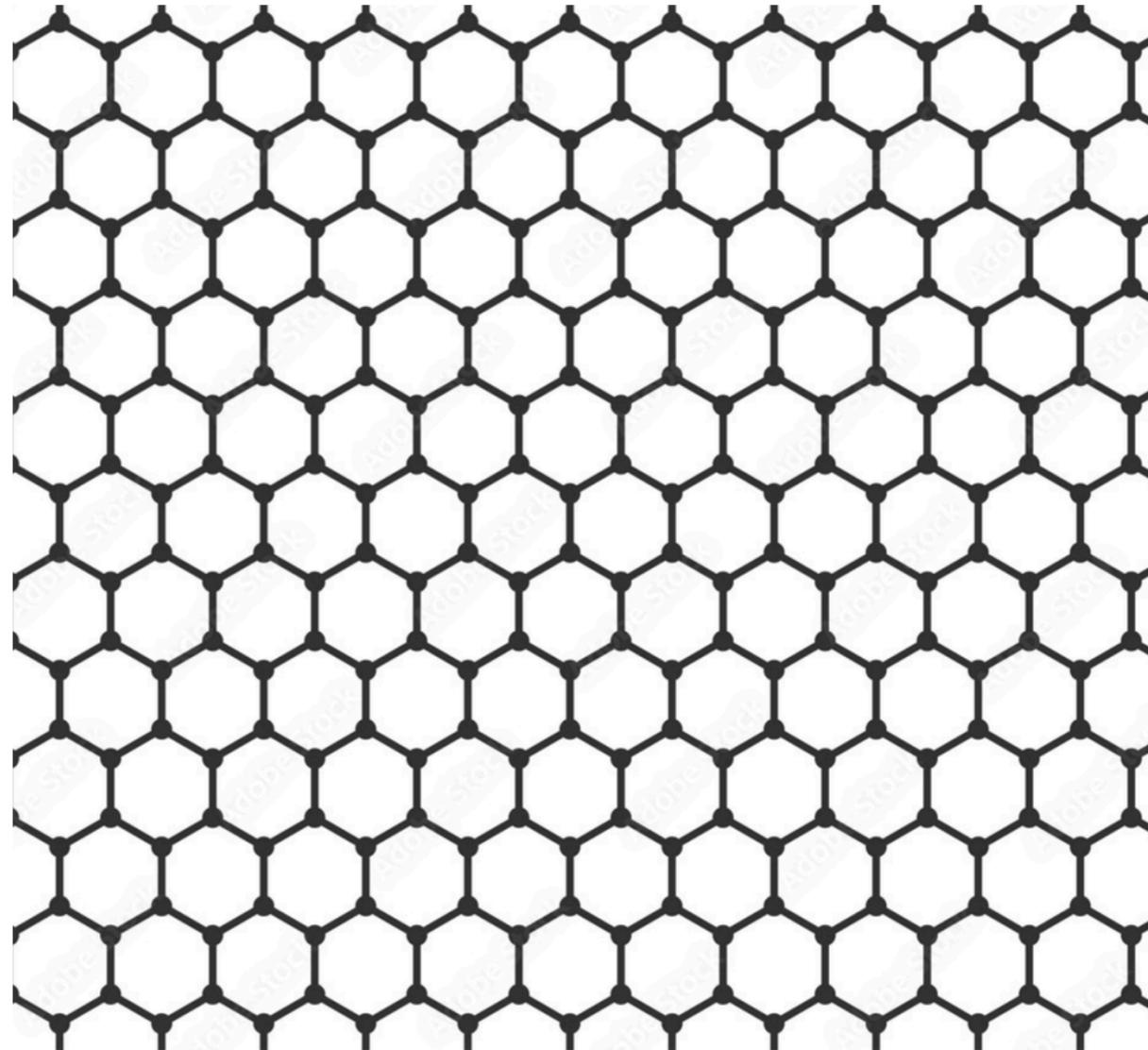
Nanomaterials

Grafeno



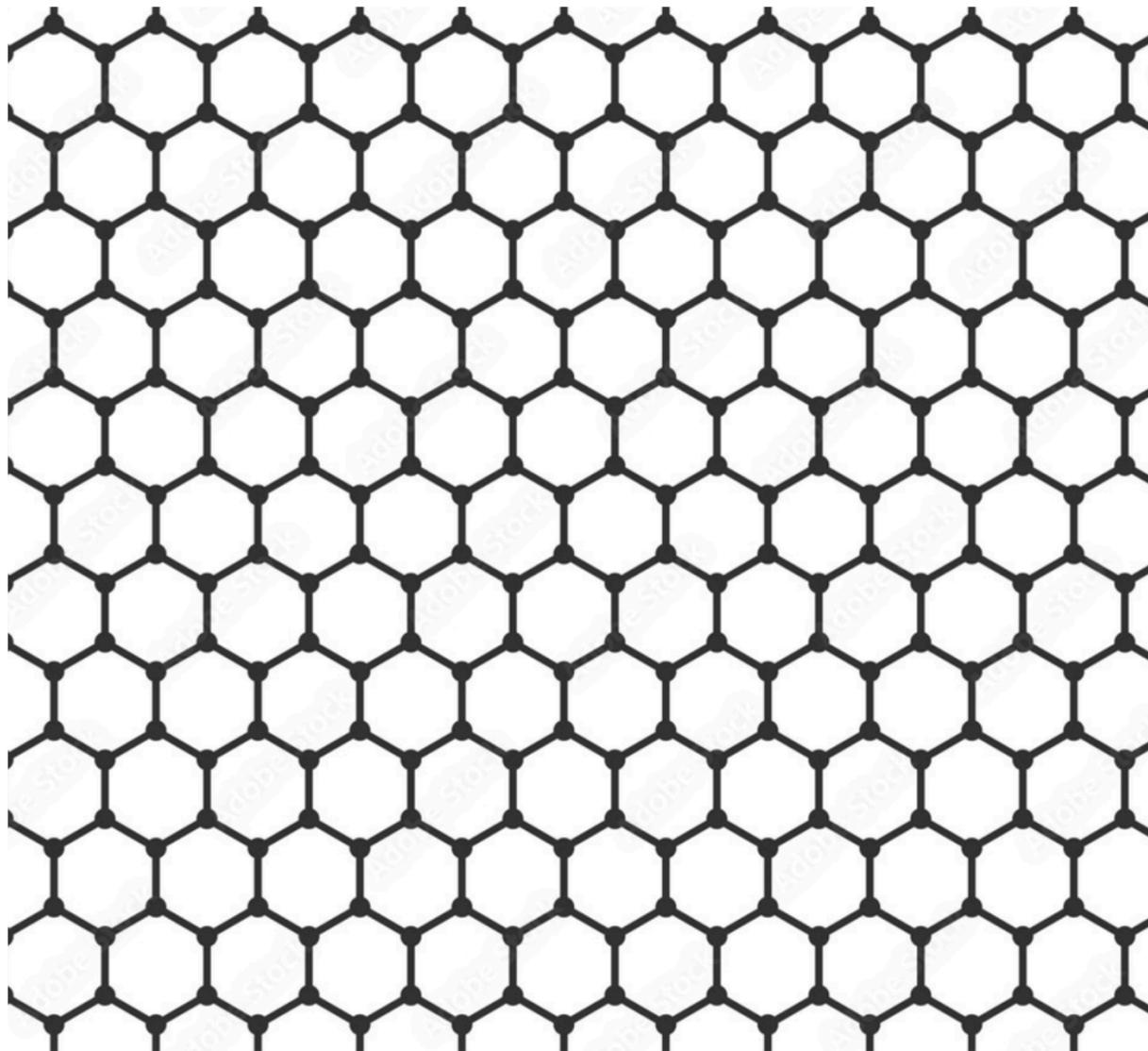
Nanomateriais

Grafeno



Nanomaterials

Grafeno



The Nobel Prize in Physics 2010



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Andre Geim

Prize share: 1/2

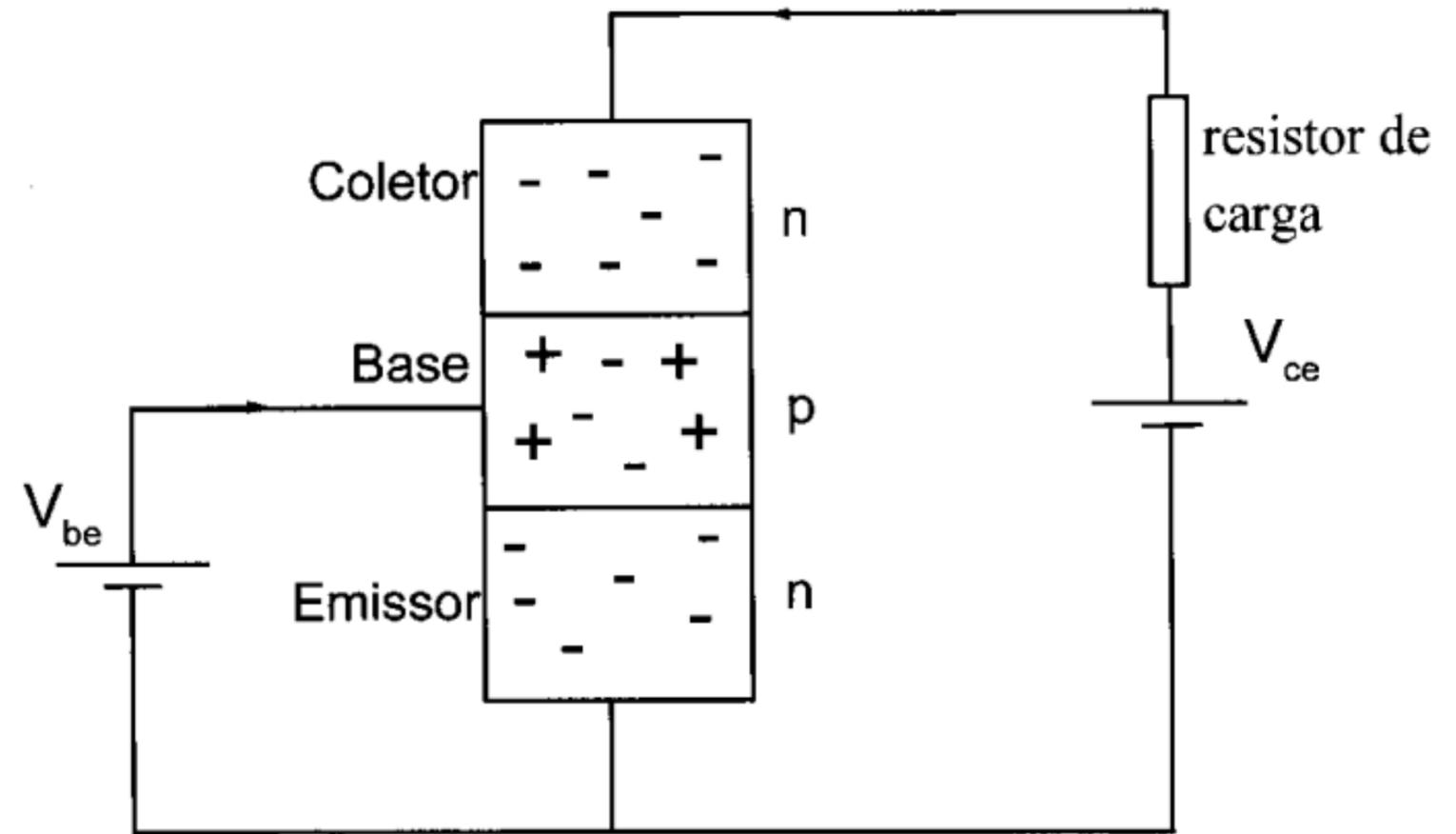
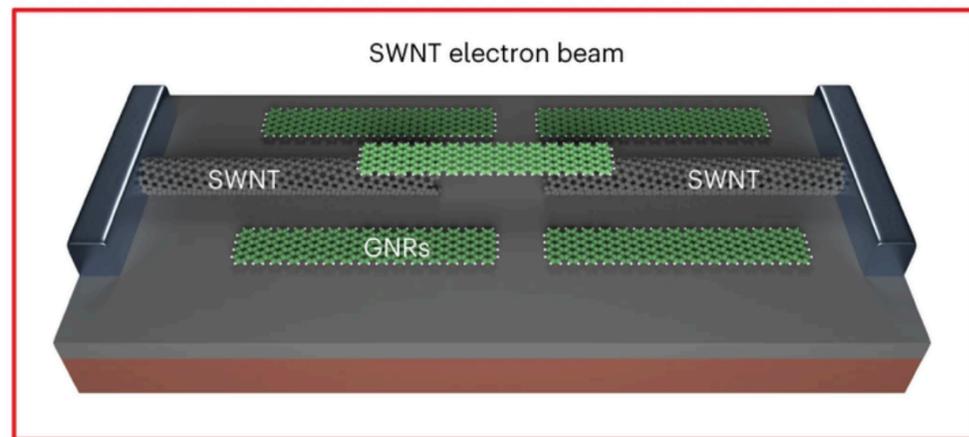


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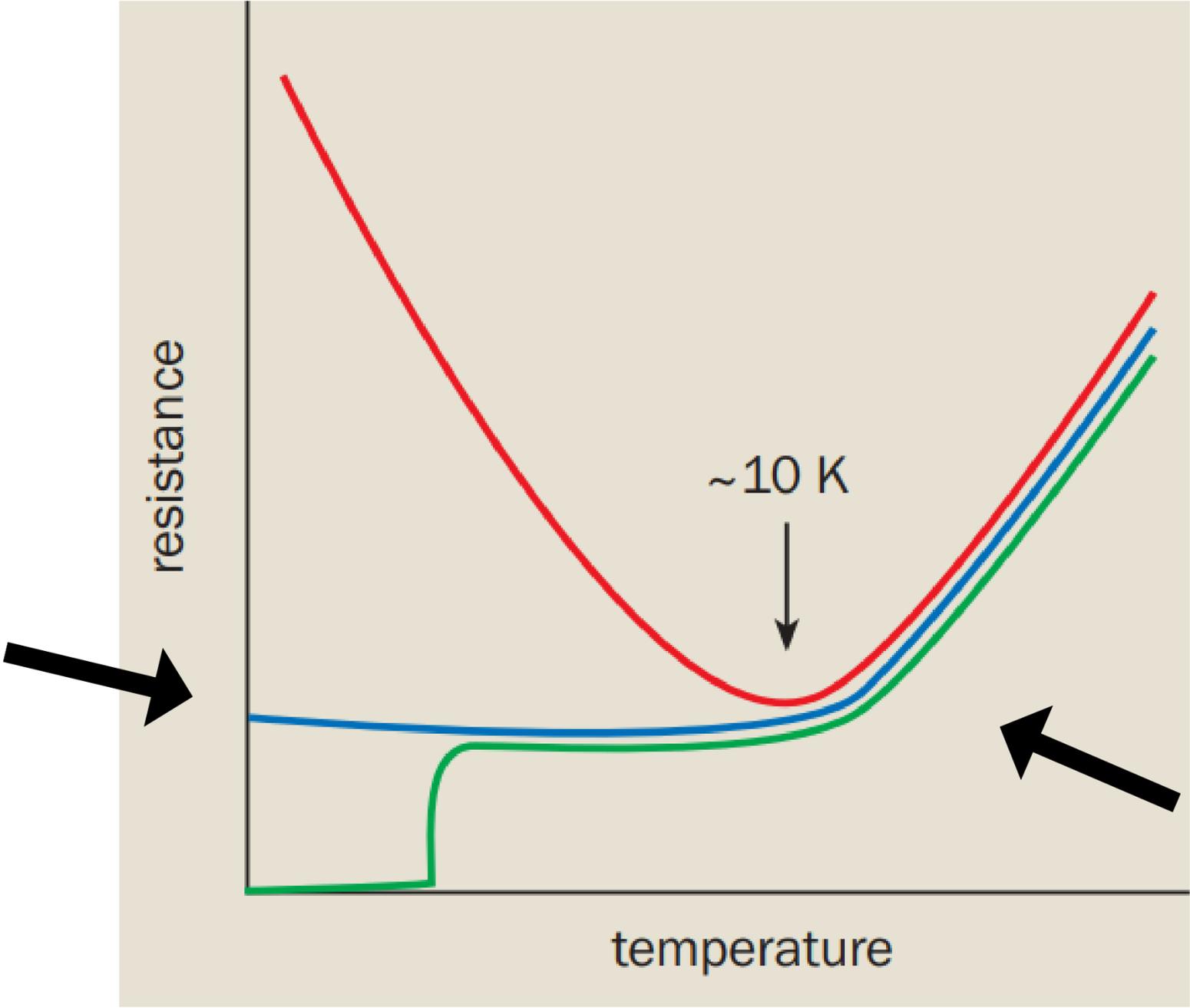
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Corrente eletrica



Corrente eletrica

Metal



Superconductor

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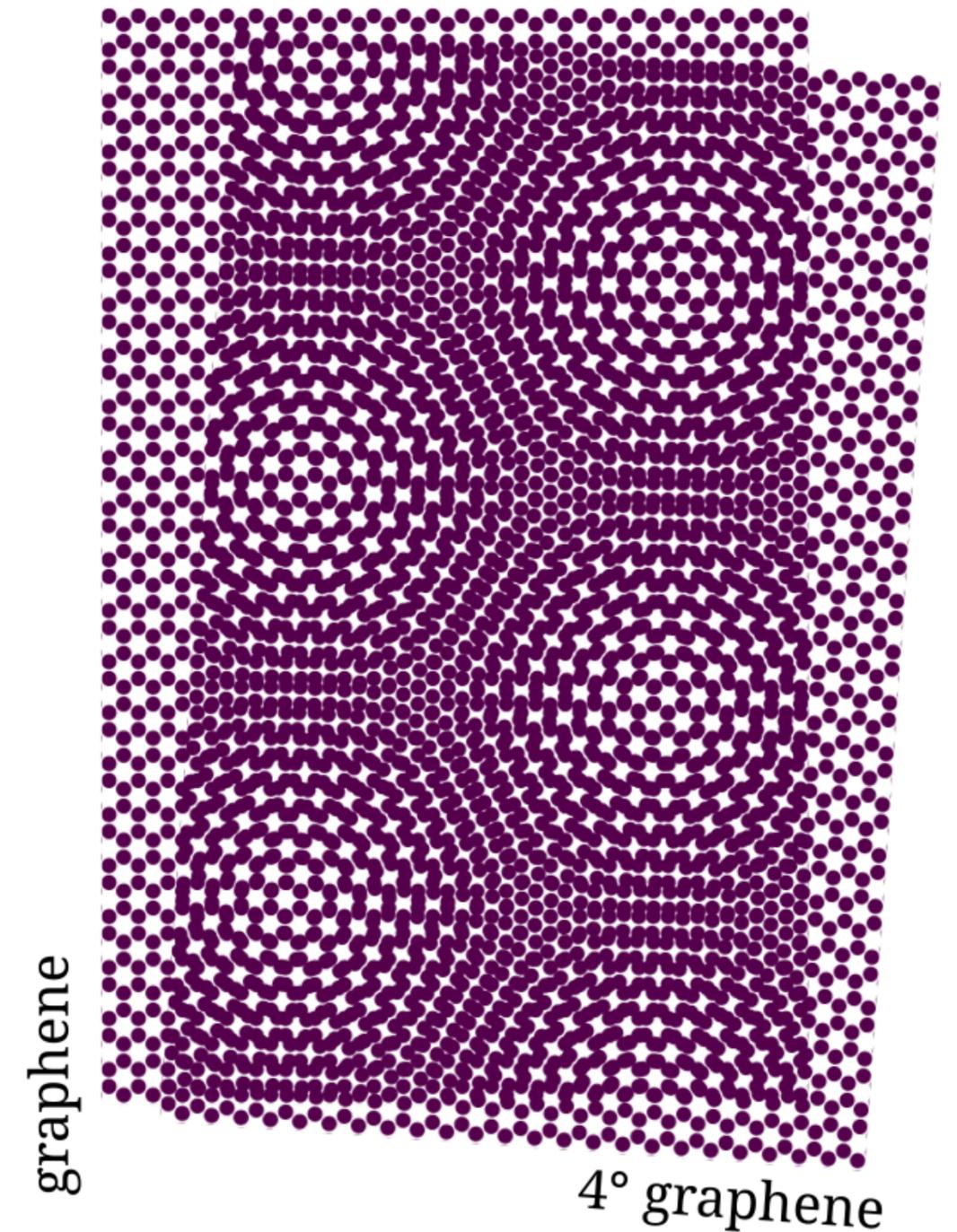
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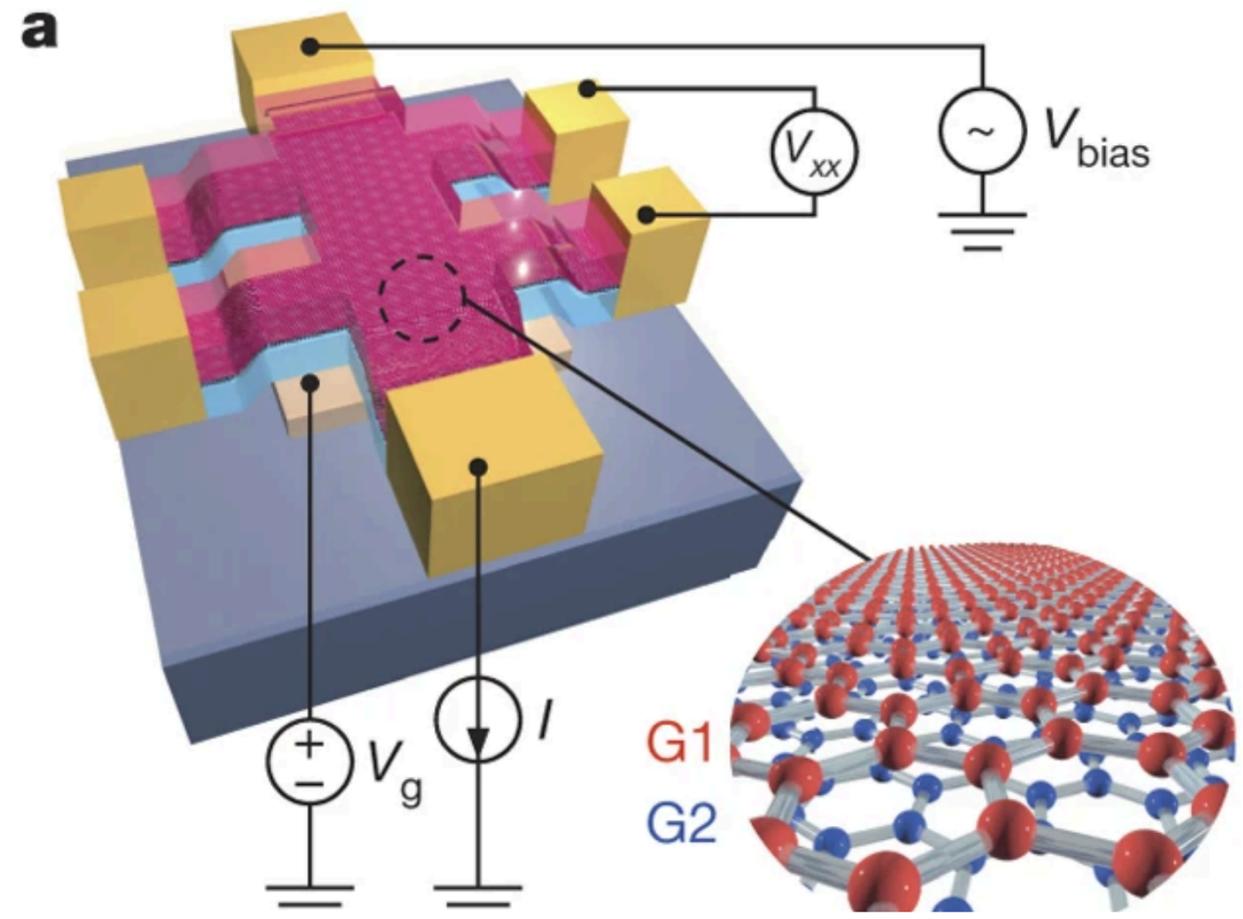
[Yuan Cao](#) , [Valla Fatemi](#), [Shiang Fang](#), [Kenji Watanabe](#), [Takashi Taniguchi](#), [Efthimios Kaxiras](#) & [Pablo Jarillo-Herrero](#) 

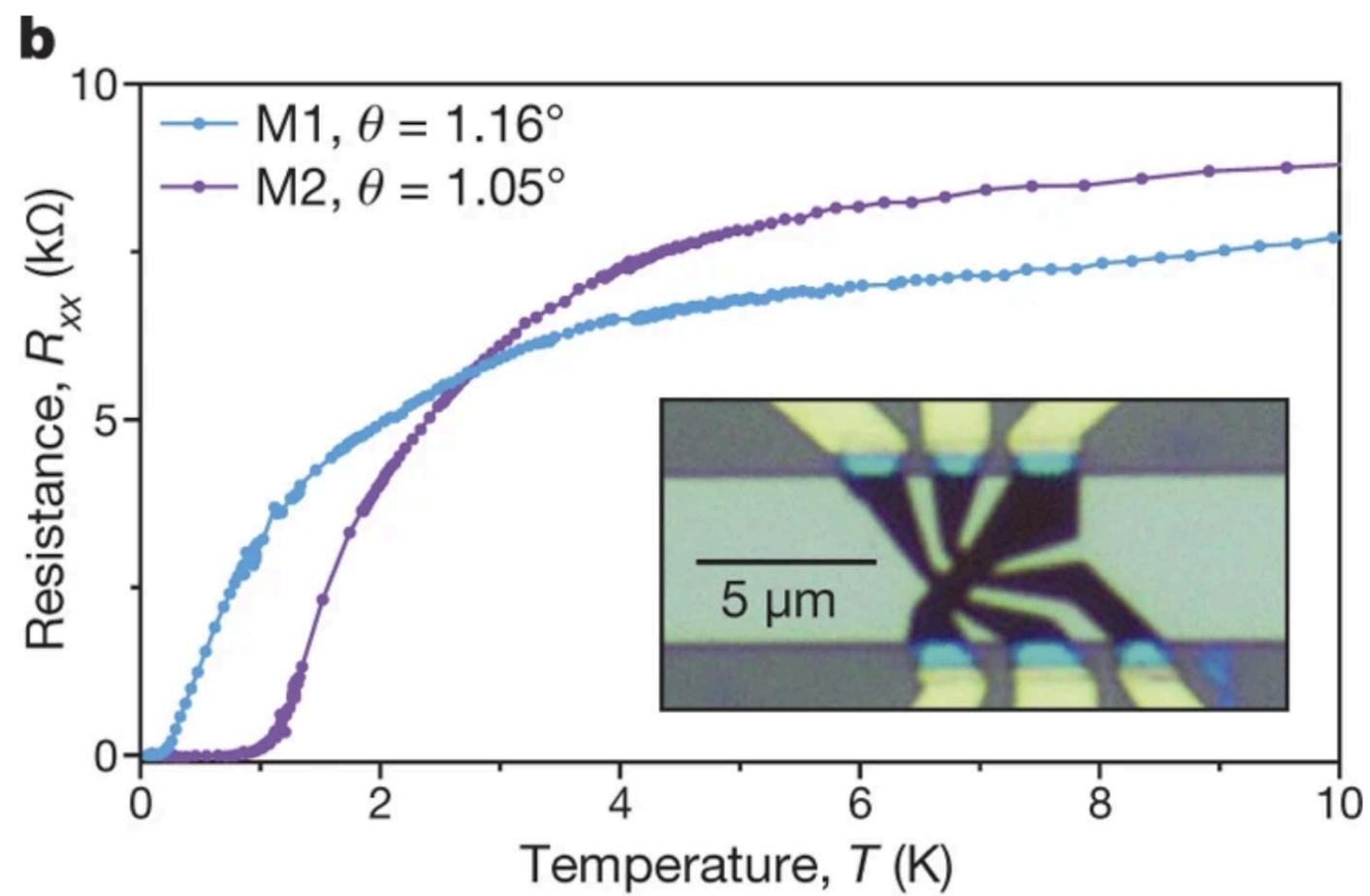
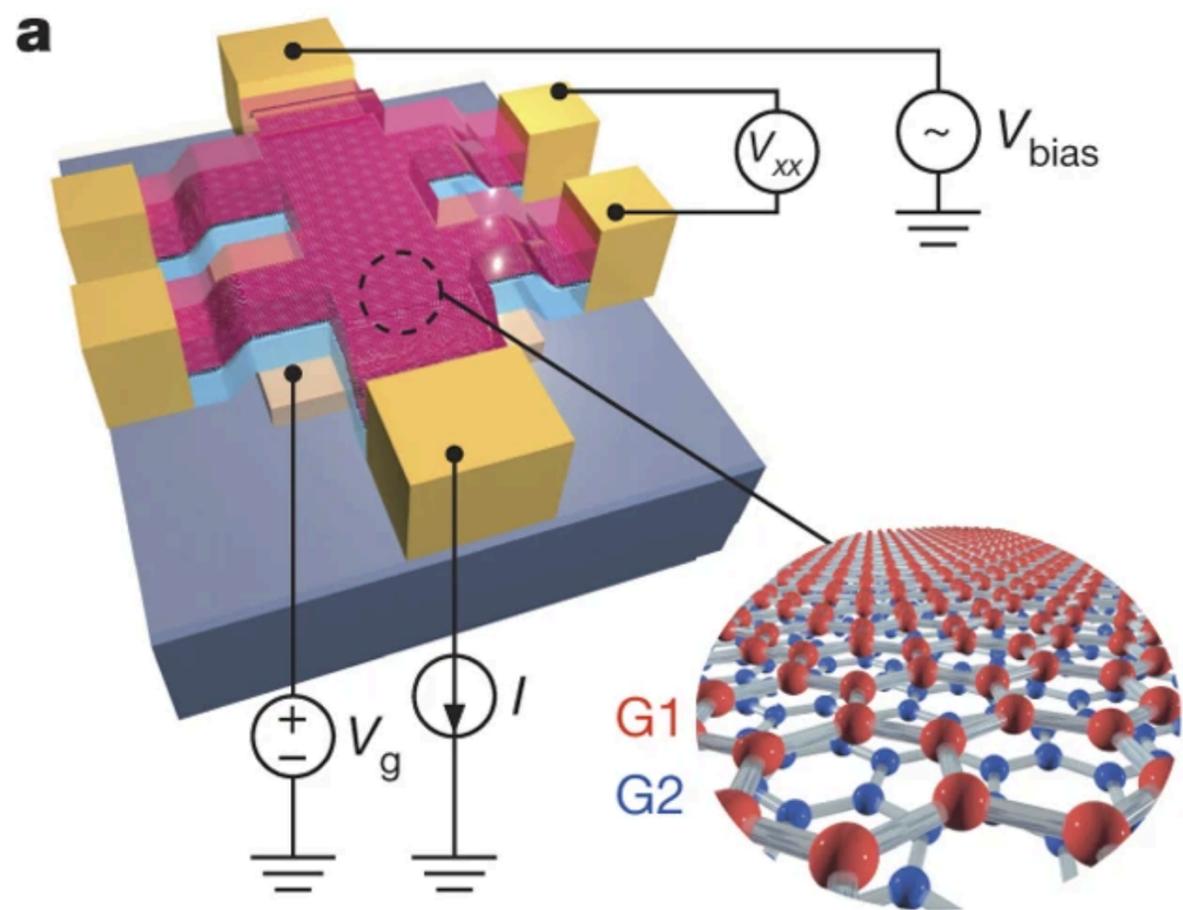
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Abstract







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