

DMM 2025

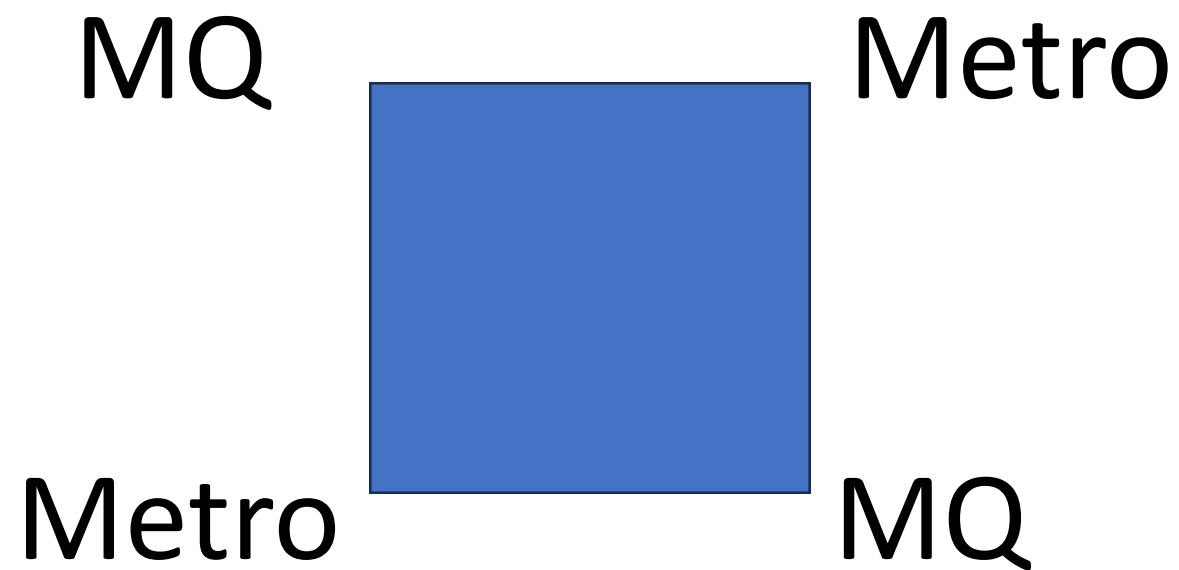


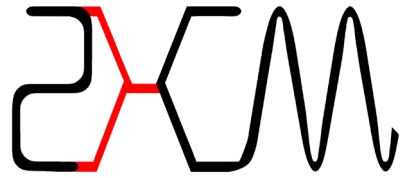
150 anys de la Convenció del Metre

100 anys de la Mecànica Quàntica



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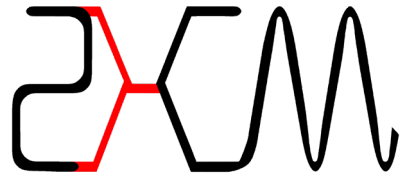
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Metrologia → MQ

teoria basada en fets experimentals amb
mesuraments

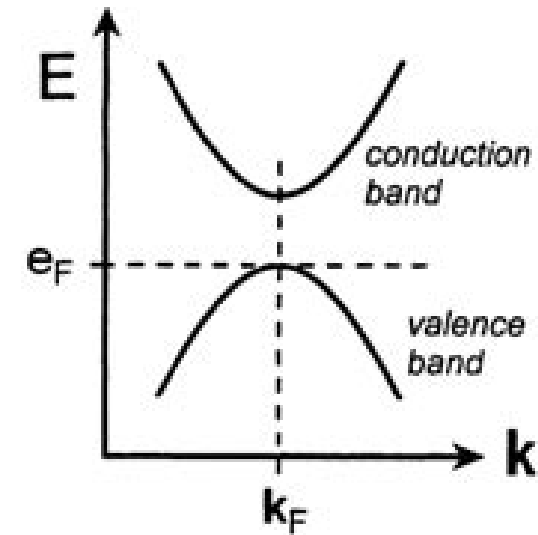
MQ → Metrologia

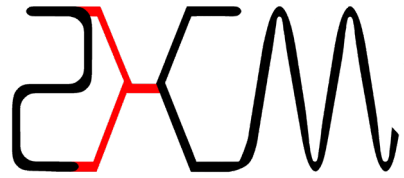


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MQ $\rightarrow$ Metrologia





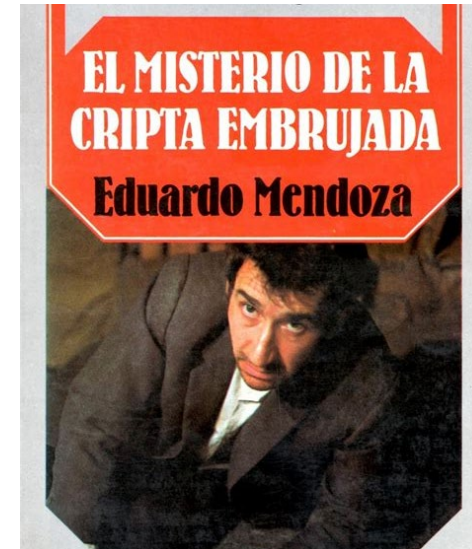
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Metrologia → MQ

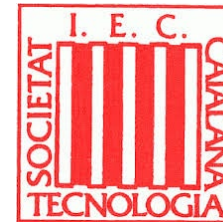
En la presentació habitual els problemes del mesurament no apareixen fins a MQ.

Massa misteris





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Quin soroll fa un arbre que cau quan no hi ha ningú que el senti?

Com saben que hi és la Lluna quan no la mirem?

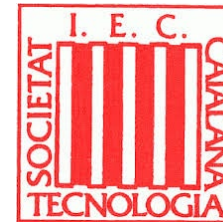
Els bombons de Forrest Gump

Форрест
Гамп





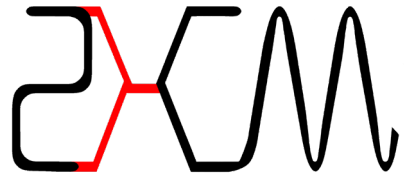
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Quina temperatura marca un termòmetre espatllat a la cara oculta de la Lluna?

"Estás midiendo la temperatura del termómetro"

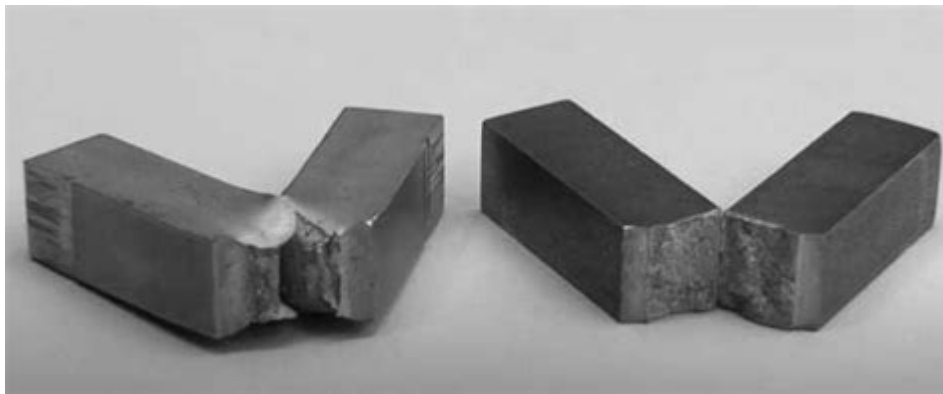
Realisme científic i realisme metrològic.

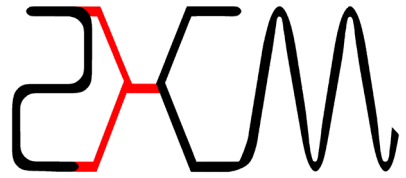


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Mesurar la planitud i
energia de trencament
d'una proveta Charpy





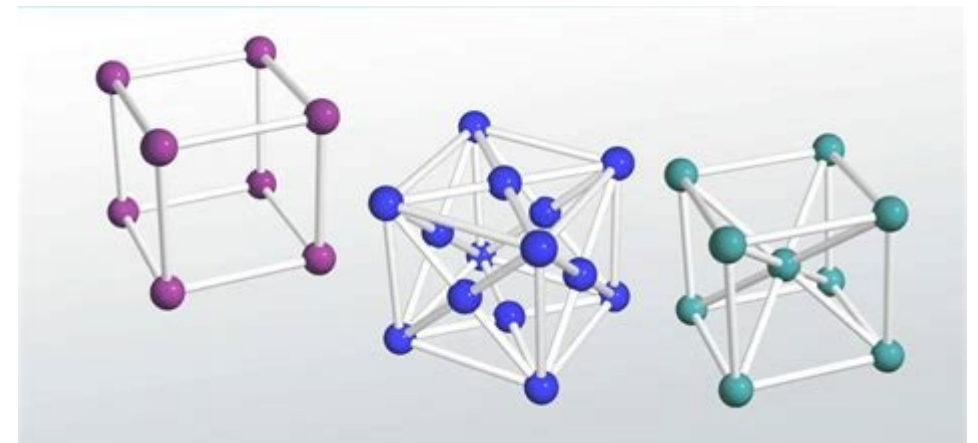
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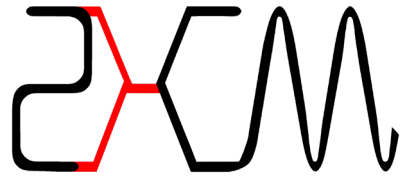


MQ $\rightarrow$ Metrologia

Comptar enters

(o fraccions)





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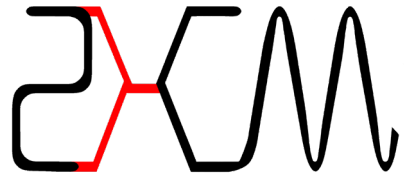


MQ → Metrologia

Comptar enters

IDÈNTICS





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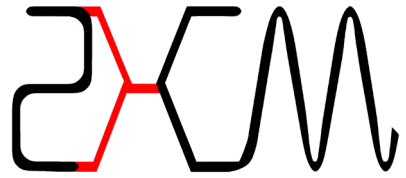


MQ → Metrologia

Comptar enters

(o fraccions)





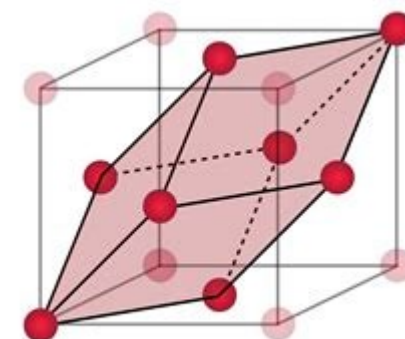
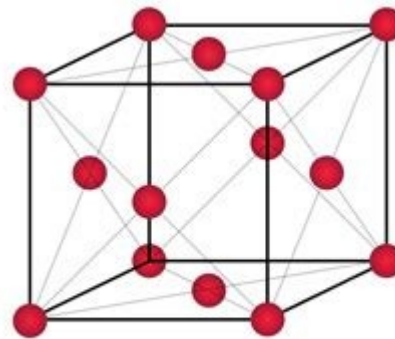
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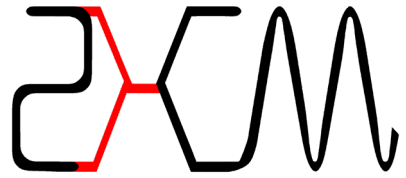


MQ $\rightarrow$ Metrologia

Comptar enters

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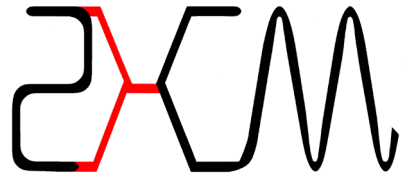


MQ → Metrologia

Comptar

Temperatura





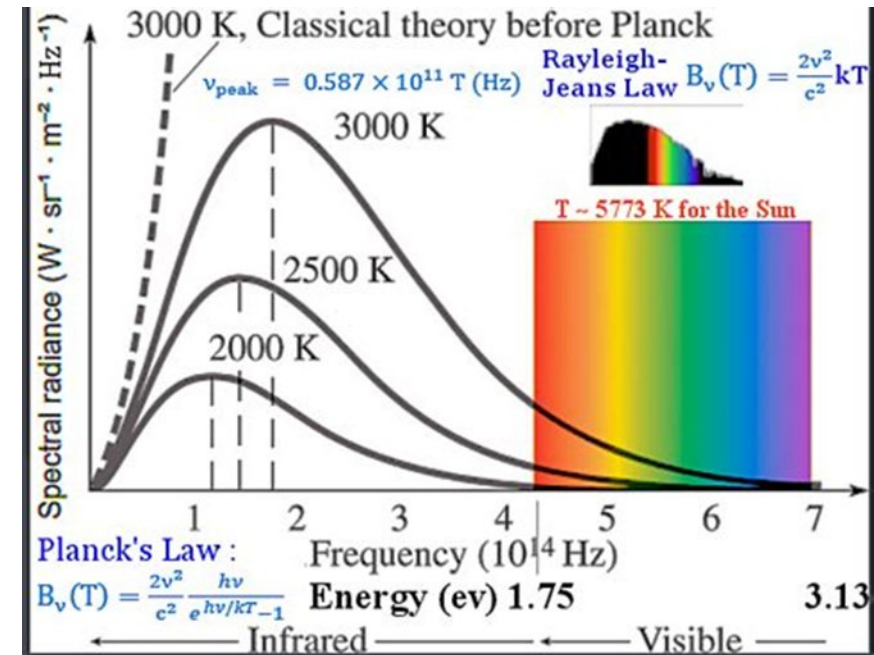
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MQ → Metrologia

Primer experiment quàntic (1900)

Temperatura

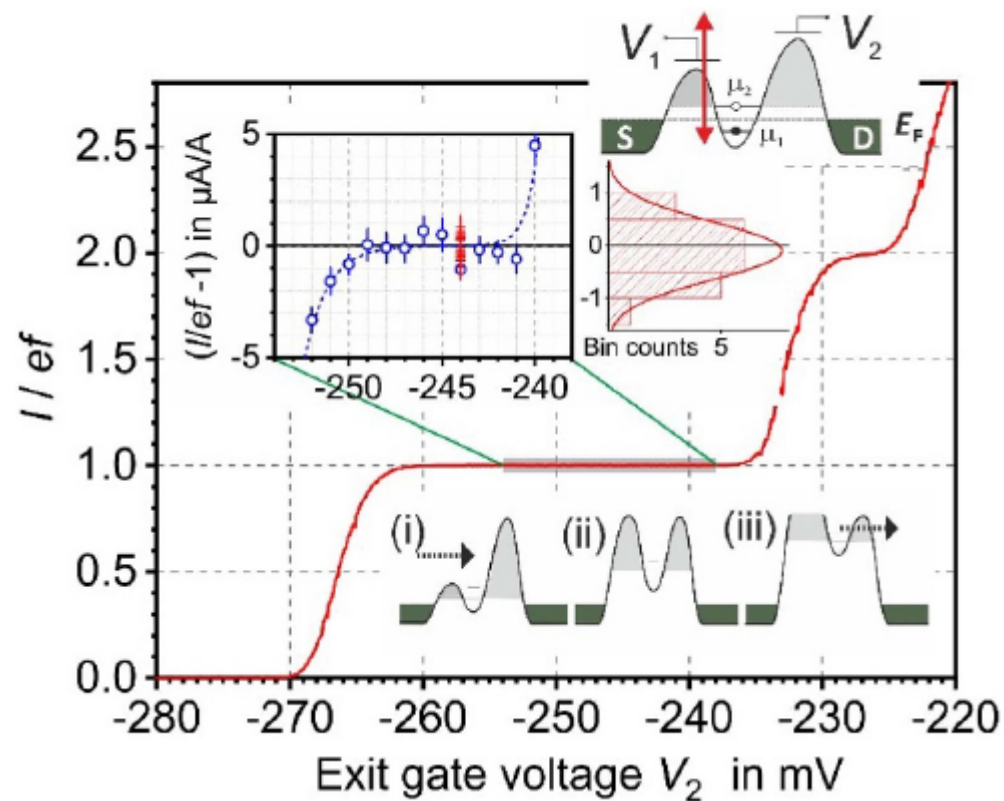


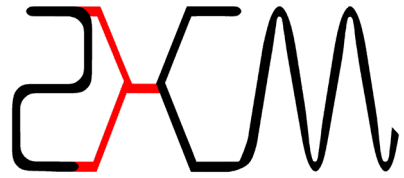


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Replans

Current monoelectrònica



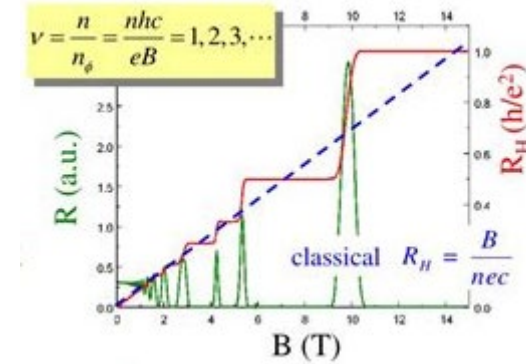


DMM 2025



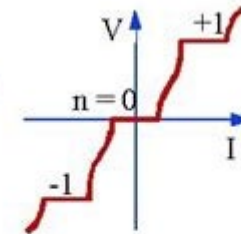
Replans

Efecte Hall Quàntic



$$V_n = \frac{h}{2e} nf$$

- $h/2e \approx 2 \mu\text{V}/\text{GHz}$
- Josephson constant $K_J = 483\,597.9 \text{ GHz/V}$



Efecte Josephson

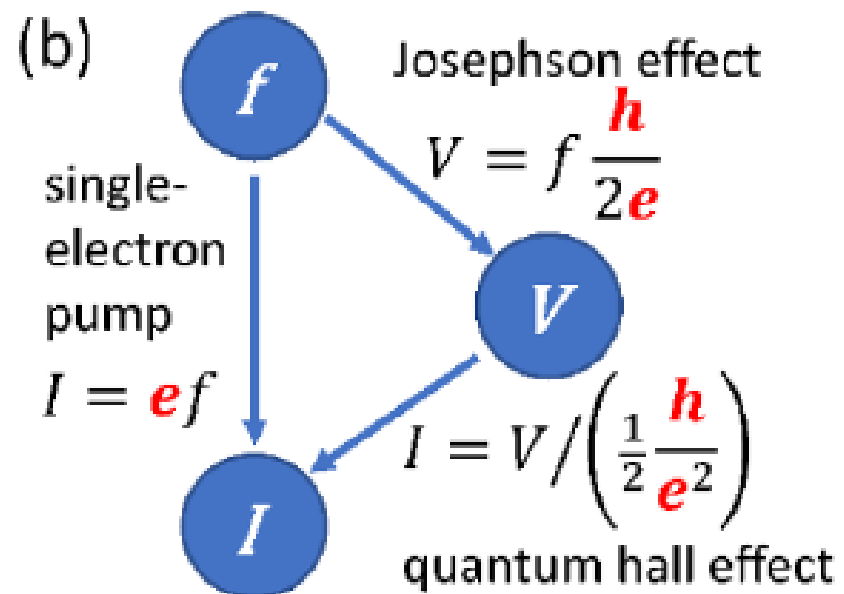


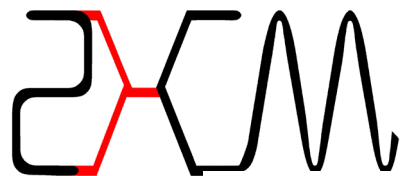
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Redundància

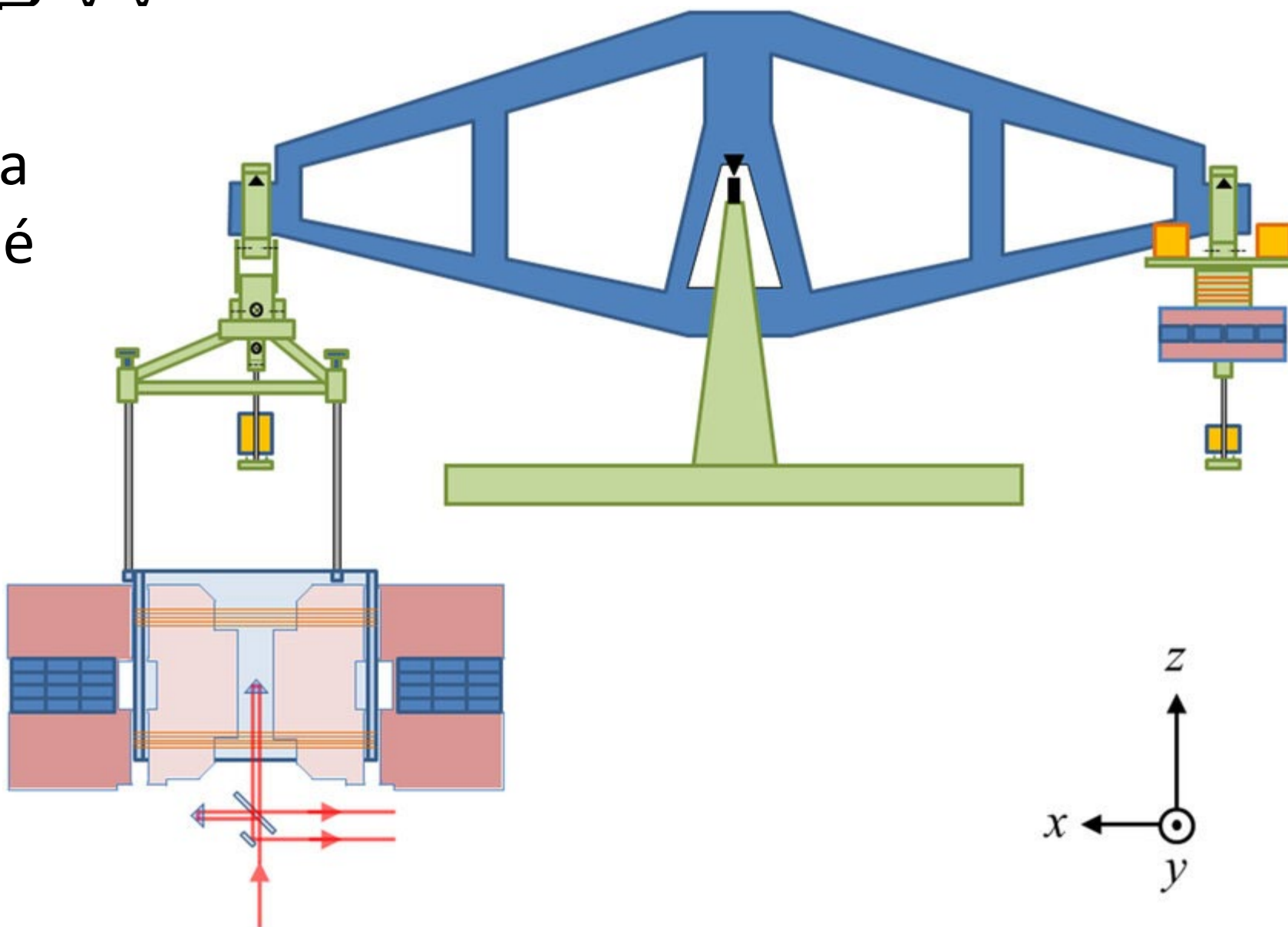
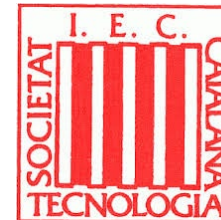
Triangle elèctric





La
massa
també

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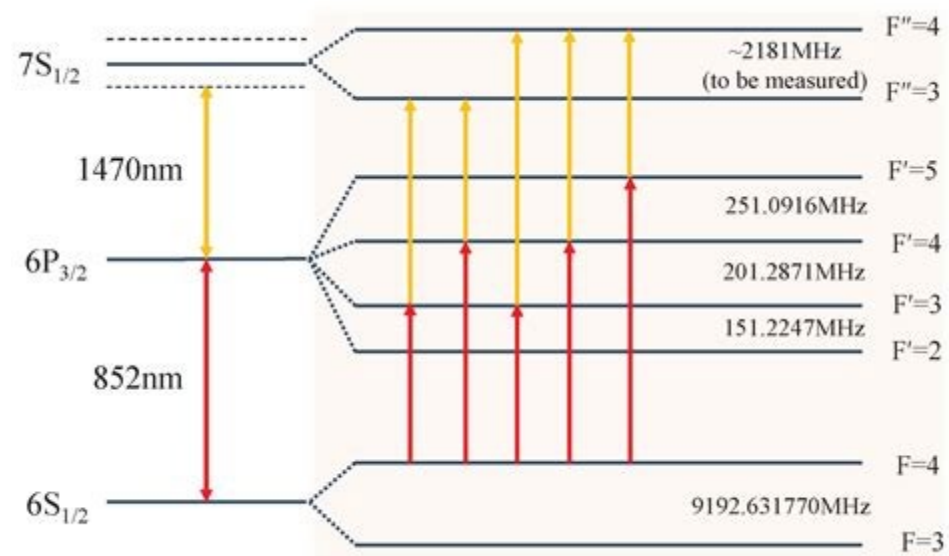


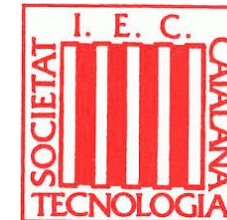


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El temps





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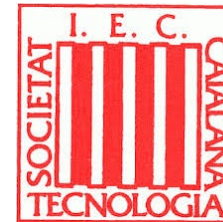


La longitud





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La intensitat
lluminosa

PQED Detector
d'eficàcia
quàntica
predictible

$$Rp(\lambda) = \frac{e\lambda}{hc} [1 - \delta(\lambda)][1 - \rho(\lambda)]$$