Multimedia in Physics: Applets

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Orbity nie-keplerowskie

Gravitazione.exe

Gravitazione.exe — skrót.lnk

Orbity keplerowskie

lejek_a.mov

lejek_b.mov

lejek_c.mov

Orbity niekeplerowskie

Orbity keplerowskie ?

DSCN0649.MOV

DSCN1051.MOV

Drgania (1)


Unregistered HyperCam
Window
Help
00:00:00


Unregistered HyperCam
Window
Help
00:00:01

Drgania (2) - tłumienie

Dscn0252.mov

Drgania (3) - wymuszone

Drgania (4) - sprzężone

Drgania (4) - sprzężone

Dscn0243.mov

Dscn0244.mov

modo simmetrico $\omega_{12}=k_1 /m$

modo antisimmetrico $\omega_{22} =k_1 /m+2k_2/m$

Quantum scattering calculated easily

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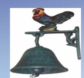
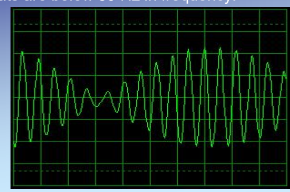
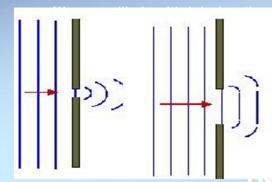
Electrons and waves



1. Wave phenomena are characterized by interference. The impression of an acute dissonance happens when beats are below 50 Hz in frequency.

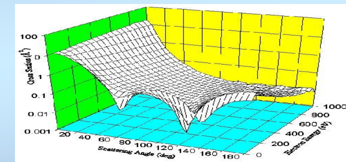


2. Quantum mechanics is another example of wave interference. In a scattering processes, the monochromatic, well-collimated beam of particles corresponds to a plane de Broglie wave
... ave number.

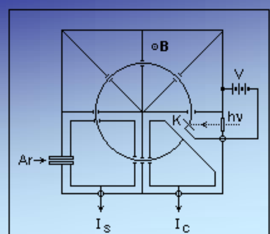


3. Following Huyghens' principle, the scattering center acts as a source of spherical wave $\Psi' = \exp(ikr)$.

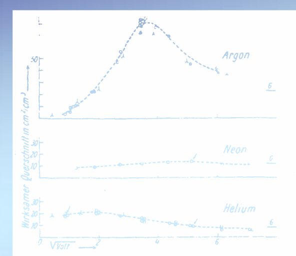
4. Obviously, the scattered wave need not be *perfectly* spherical, so we add an angular factor $\Psi' = f(\theta) \exp(ikr)$.
Angular distribution of scattered electrons are complicated functions of energy.

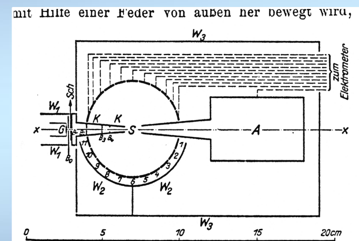


Ramsauer effect

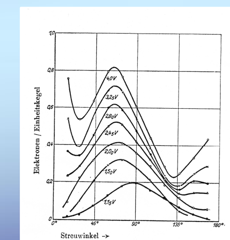


Ramsauer's Apparatus





Maßstäbliches Schema der Versuchsanordnung



Carl Ramsauer, in Gdansk, 1921 was the first who showed that electrons behave like waves: at some energies the gases like Ar, Kr become transparent to them: the cross section shows a minimum. This is a wave-like effect.

In 1931, in Berlin- Reinickendorf, C. Ramsauer and R. Kollath measured angular distribution of scattered electrons, confirming **Quantum wave mechanics**.

Quantum scattering calculated easily

The scattering amplitude is given by:

$$f(\theta)=\frac{1}{2ik}\sum_{\ell=0}^{\infty}(2\ell+1)\left(\exp(2i\eta_\ell)-1\right)P_\ell(\cos\theta)$$

where $\ell\hbar$ is the angular momentum in the collision, ℓ=0,1,2...,
η_ℓ are the "phase shifts" of the respective partial waves
and $P_\ell(\cos\theta)$ are Legendre polynomials

The integral cross-section is given by

$$\sigma_{\text{int}}=\frac{4\pi}{k^2}\sum_{\ell=0}^{\infty}(2\ell+1)\sin^2\eta_\ell$$