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ON INNOVATION IN THE  
MODERN EDUCATION SYSTEM**

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**INNOVATION IN THE MODERN  
EDUCATION SYSTEM**

**Part 18**

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LABARATORIYA DARSLARIDA ELEKTRONNING SOLISHTIRMA ZARYADINI ANIQLASH.

**Hikmatov Behzod Amonovich**

*Buxoro davlat universiteti fizika kafedrası o'qituvchisi*

**Nasullayev Baxtiyor**

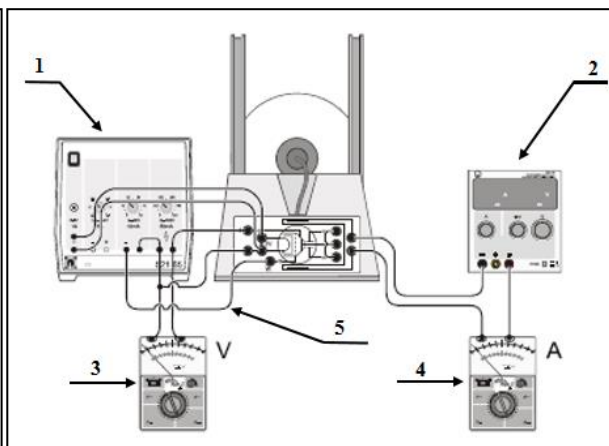
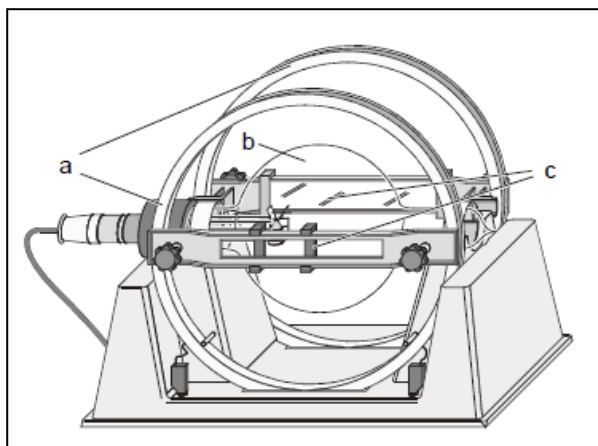
*Buxoro davlat universiteti fizika yo'nalishi 4-bosqich talabasi*

**Annotatsiya:** Elektron - manfiy zaryadlangan barqaror elementar zarracha. Barcha moddalarning atomlaridagi elektron qobiqlar elektronlardan tashkil topgan. Elektronni kashf qilishning zaruriy shartlaridan biri Benjamin Franklinning bayonotidir. 1749-yilda u elektr toki moddiy modda ekanligi haqidagi gipotezani ishlab chiqdi. Aynan uning asarlarida birinchi marta musbat va manfiy zaryadlar, kondansator, razryad, batareya va elektr zarrasi kabi atamalar qo'llanilgan. Elektronning solishtirma zaryadi manfiy, protonniki esa musbat deb hisoblanadi.

**Kalit so'zlar:** elektron, solishtirma zaryad, magnit maydon, Lorens kuchi, elektron nur trubkasi, Gelmgolts g'altaklari.

Elektronning solishtirma zaryadini elektron nurli trubkada aniqlaymiz. Elektron nur trubkasida past bosimda vodorod molekulalari bo'ladi va ular elektronlar bilan to'qnashganda nur chiqaradi. Bu esa elektronlarning orbitasini bevosita ko'rinadigan bo'lishiga olib keladi va orbita radiusi po'lat lentali o'lchagich bilan o'lchab olinishi mumkin. Magnit maydoni Gelmgolts g'altaklar juffida hosil qilinadi va u Gelmgolts g'altaklaridagi tok kuchi  $I$  ga to'g'ri proporsional.

Tajribada o'lchashlarni qorong'ilashtirilgan kamerada bajariladi. Elektronning solishtirma zaryadini aniqlash qurilmasi 1-rasmda va uning ulash sxemasi 2-rasmda ko'rsatilgan. Barcha ulanishlarni bajarib trubkaning energiya manbaini qo'shamiz va tezashtiruvchi kuchlanishni  $U=300$  V ga o'rnatamiz. Termoelektron emissiya bir necha minutdan keyin, katod qizib olgandan keyin boshlanadi. Elektronlar nurining fokusini Venalt Silindridagi kuchlanishni 0...10 V oraliqda o'zgartirish bilan to aniq, o'tkir uchli nur hosil bo'lguncha optimallashtirib olamiz.

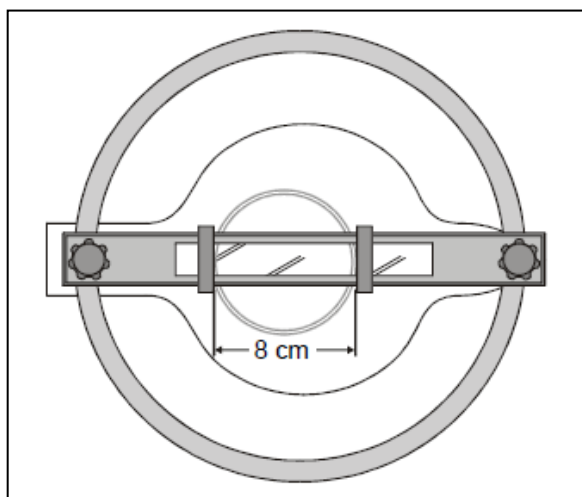


**1-rasm. Elektronning solishtirma zaryadini aniqlash uchun tajriba qurilmasi:**

a-Gelmgolts g'altaklari;  
 b-toza nur trubkalari;  
 c-po'lat lentali o'lchash asbobi;

**2-rasm. Qurilmaning elektr sxemasi:**

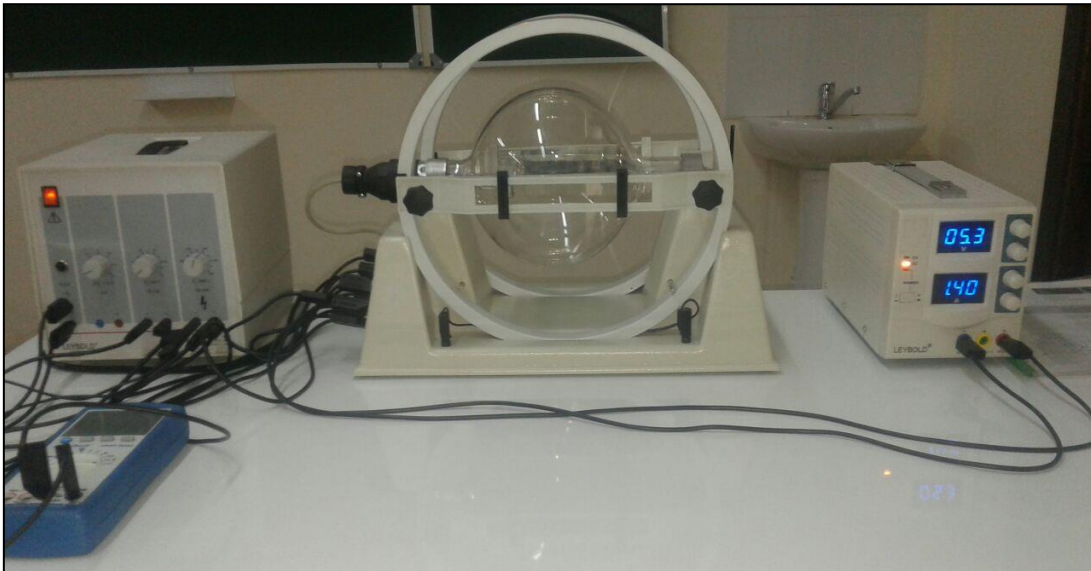
1-Trubkaning energiya manbai 0-500 V;  
 2-DC energiya manbai 0-16 V,  
 3-Voltmetr;  
 4-Ampermetr;  
 5-Xavfsiz ulash simlari.



**3-rasm. Po'lat lentali o'lchagich bilan elektronlarning hosil bo'lgan orbitasi diametrini o'lchash.**

Gelmgolts g'altaklarini DC energiya manbaiga ulaymiz va elektronlar nuri yopiq orbita hosil qilib aylanadigan tok kuchini topamiz. Po'lat lentali o'lchash qurilmasi bilan hosil bo'lgan orbita diametrini o'lchab olamiz. (3-rasm)

Qurilmada olingan natijalardan elektronning o'rtacha solishtirma zaryadi qiymati aniqlandi  $\frac{e}{m_e} = 1,753083 \cdot 10^{11} C/kg$



**4-rasm. Tajriba qurilmasi ish jarayonida.**

Bu qiymat boshqa usullar orqali topilgan tajriba natijalariga, misol uchun, rentgen nurlarining to'liq uzunligini o'lchash orqali Berden aniqlagan qiymat  $\frac{e}{m_e} = 1,7601(3) \cdot 10^{11} C/kg$  ga juda yaqin. Magnit maydonda elektronning harakati tezlashtiruvchi potensial  $U$  va tok kuchi  $I$  ga bog'liqligi o'rganildi. Kuchlanish  $U$  ning o'zgarishi magnit maydonda harakatlanayotgan zarrachalarning tezligini oshiradi. Agar  $I=const.$  bo'lsa kuchlanish oshishi bilan elektronlarning harakat orbitasi diametri ortadi.

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