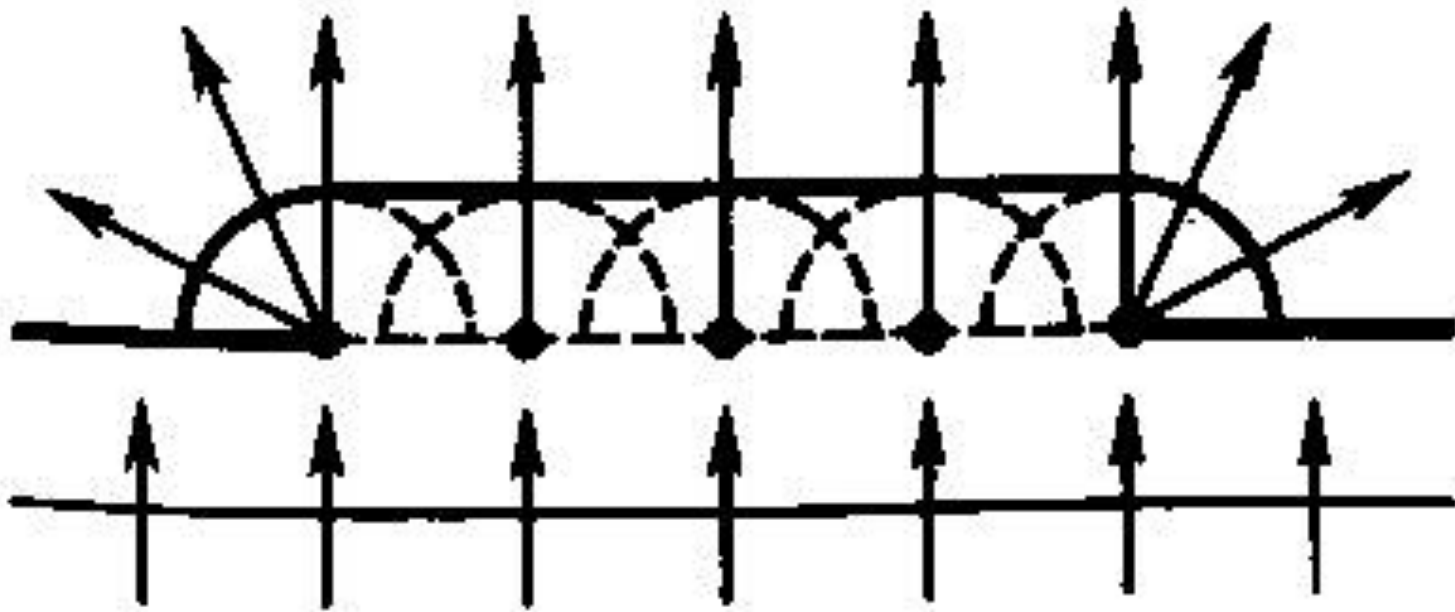


Yoruglik difraksiyasi

- Yoruglik difraktsiyasi deb ataladigan xodisada yoruglik nurlari shaffofmas tusiklardan egilib utib geometrik soya soxasiga kirib boradi. difraktsiya suzi lotincha bulib “egilib utish” degan ma’noni bildiradi.
- Masalan, nuktaviy monoxromatik yoruglik manbaidan tarkalayotgan yoruglik nurlarining yuliga shaffofmas jismdan yasalgan disk shaklidagi tusik joylashtirilgan bulsin. Geometrik optika konunlariga asosan, ekaranda tusikning soyasi - doira shaklidagi korongi soxa kuzatilishi lozim. Tajribada, xakikatan, shunday manzara kuzatiladi. Lekin tusikdan ekarngacha bulgan masofa tusik ulchamlaridan bir necha ming marta katta bulgan xolda ekranning tusik karshisidagi soxasidagi korongilik emas, balki ketma-ket joylashgan yorug va korongi kontsentrik xalkachalar kuzatiladi. Xuddi shunday manzara yoruglik juda kichik tirkishdan utganda xam kuzatiladi.

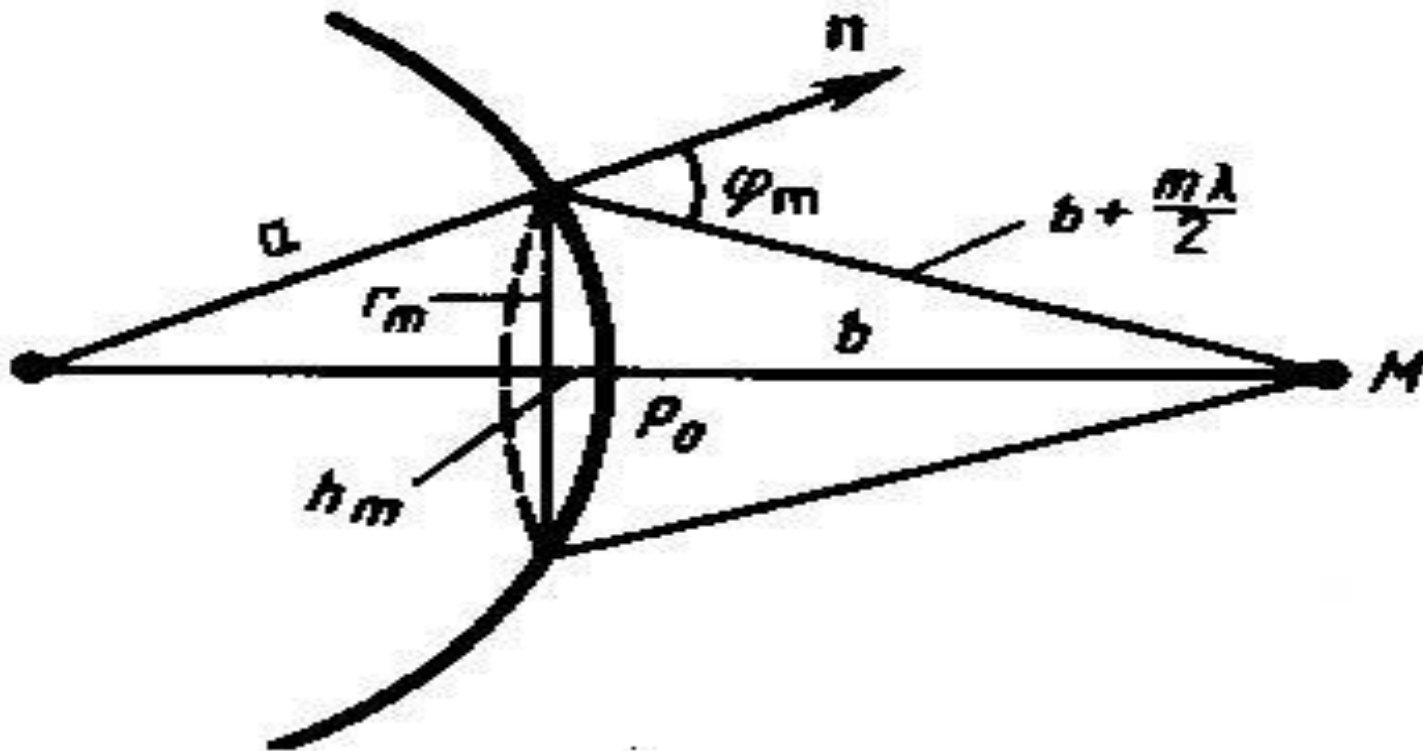
- Geometrik optika konunlariga zid bulgan yoruglik difraktsiyasining moxiyatini kuyidagi tarzda tushuntiriladi. Gyugents printsiptiga asosan, tulkin frontining xar bir nuqtasini ikkilamchi tulkinlarning manbalari deb xisoblash mumkin. Frenel esa Gyugents printsiptini takomillashtirib, bu ikkilamchi tulkinlarning manbalarini kogerent manbalar deb va fazoning ixtiyoriy nuqtasidagi tebranishi bu nuqtaga yetib kelgan ikkilamchi kogerent tulkinlar interferentsiyalanishining manzarasi deb karash lozim, degan fikrni ilgari surdi. Bu taomillashgan printsipti Gyugents-Frenel printsipti deb yuritiladi. Bu printsipti yoruglik difraktsiyasiga oid bir kator xodisalarni tushuntirib bera olgan.

Phrenel-Gyugens prinsipi

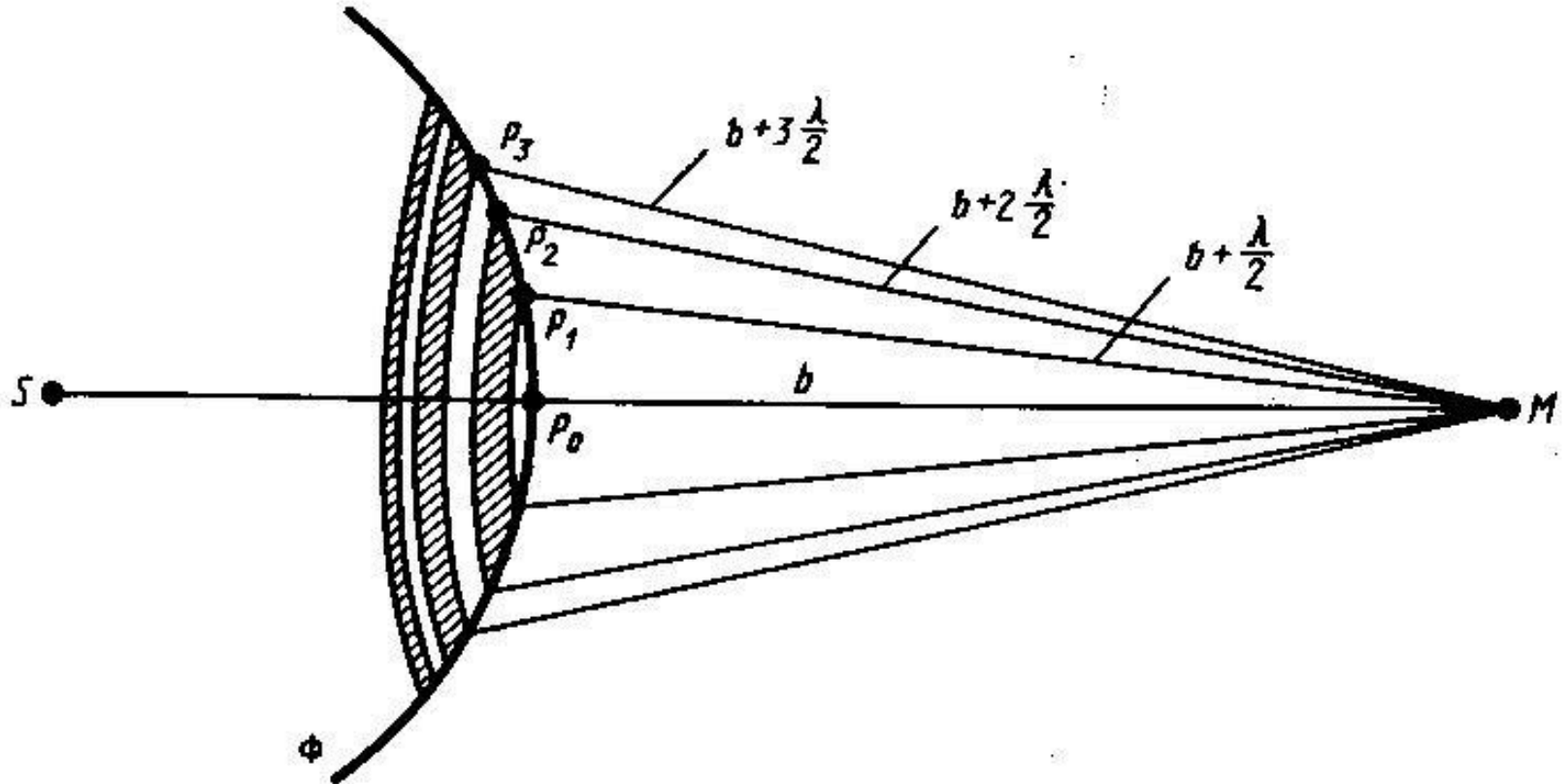


- Frenel yorug'lik difraksiyasini tushuntirish uchun o'tayotgan to'lqin frontini elementar to'lqinlar manbai bo'lgan zonalarga ajratdi va ularning biror nuqtadagi ta'sirini ko'rib chiqdi. Optikada bu zonalarni Frenel zonalari deb ataladi. Frenel shu usul bilan yorug'likni to'g'ri chiziq bo'ylab tarqalishini ham tushuntirdi.

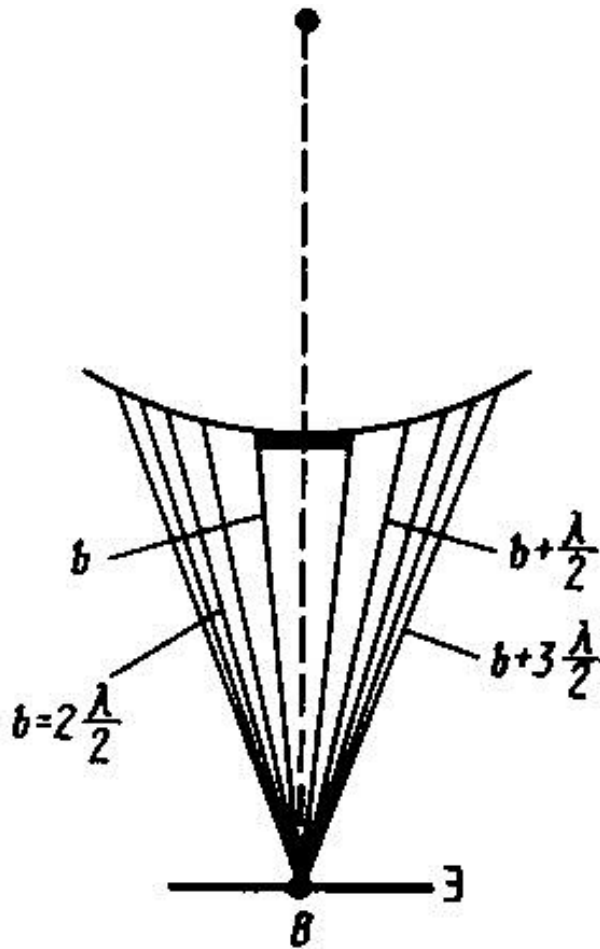
Phrenel zonalari



Phrenel zonalari

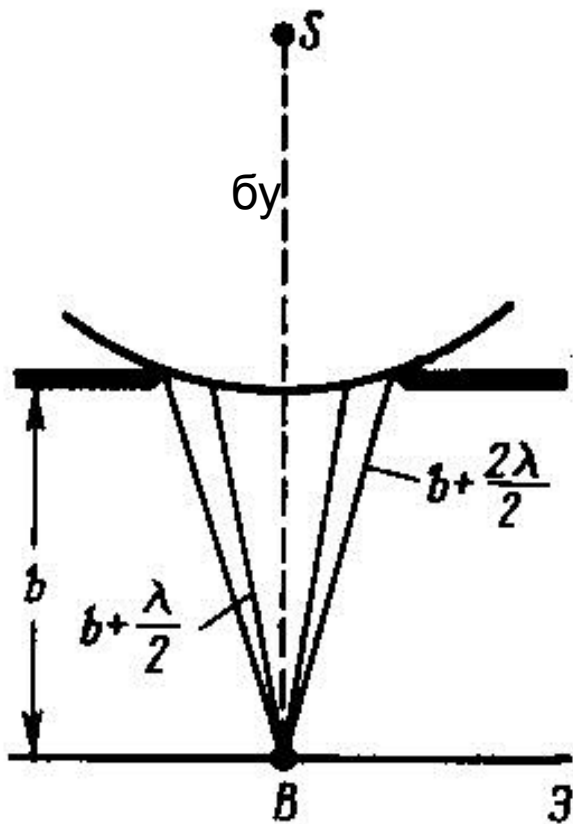


Dumaloq tosiqdan difraksiya



$$A = \frac{A_{k+1}}{2}$$

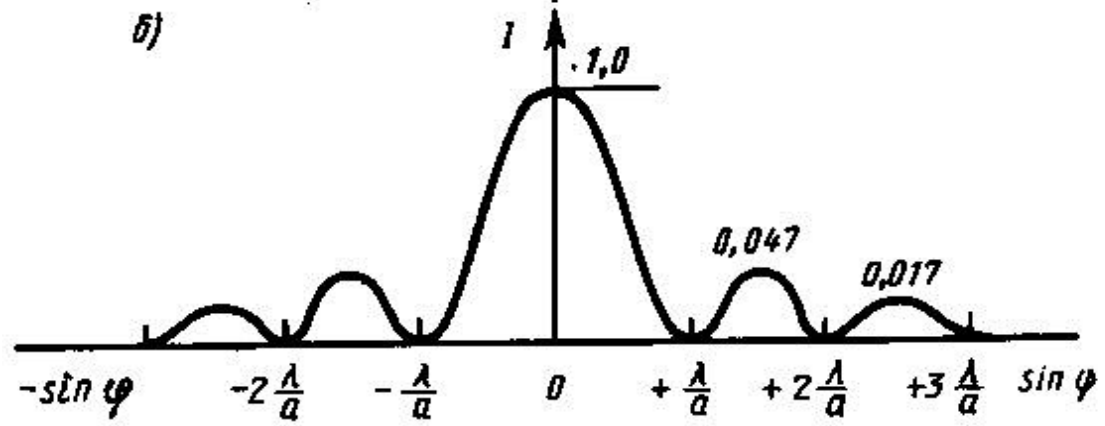
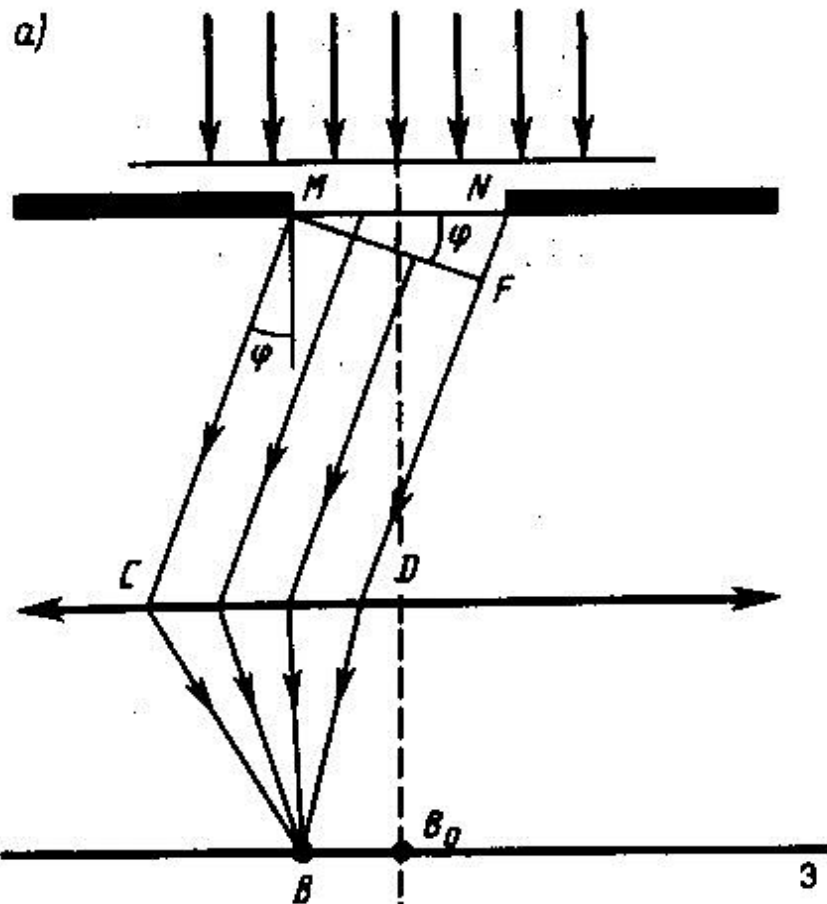
Dumaloq teshikdan difraktsiya



$$A = \frac{A_1}{2} \pm \frac{A_K}{2}$$

formulada k ning toq sonlarida (+) ishora olinadi, k ning juft sonlarida (-) ishora olinadi

Phraungofer difraksiyasi
(Фраунгофер дифракцияси)
bitta tirqishdan difraksiya



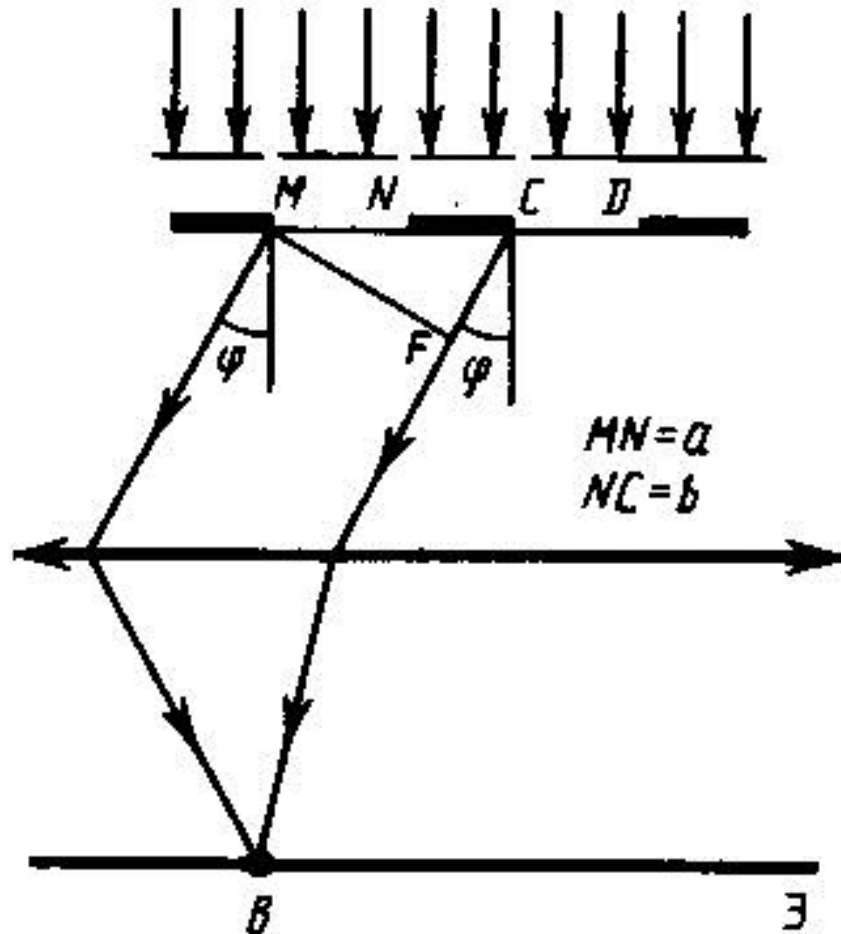
bitta tirqishdan difraksiya maksimumlari quyidagi shart bilan aniqlanadi

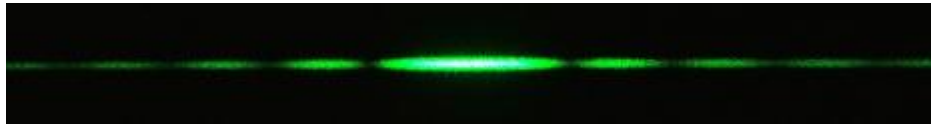
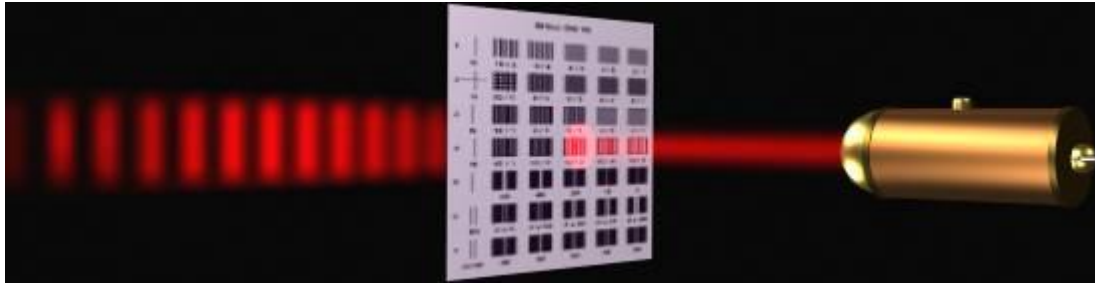
- - $a \sin \varphi = (2k-1)\lambda/2$
 - bu erda a -tirqishni eni, φ – difraksiya burchagi,
 - k - 0dan boshlangan butun sonlar ($k=0,1,2,\dots$)
- λ –tolqin uzunlik

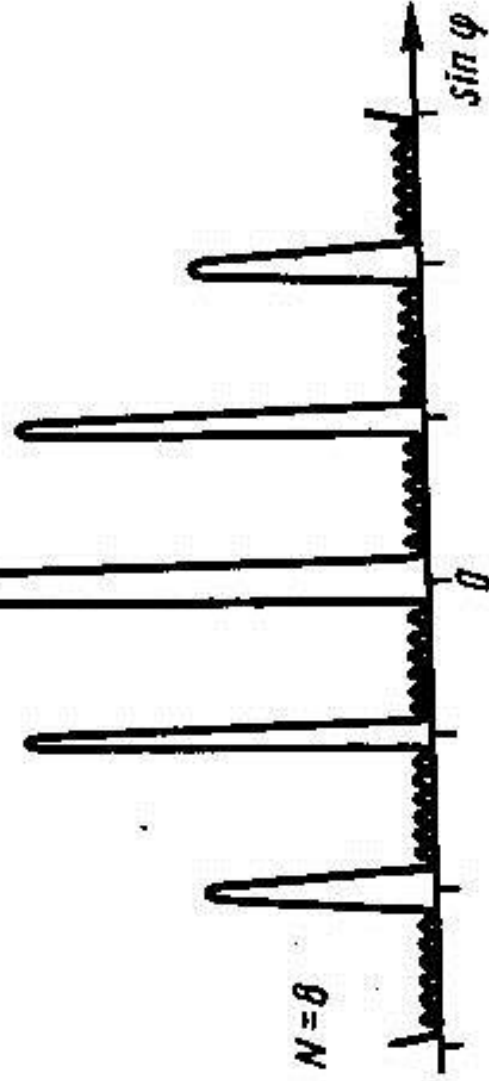
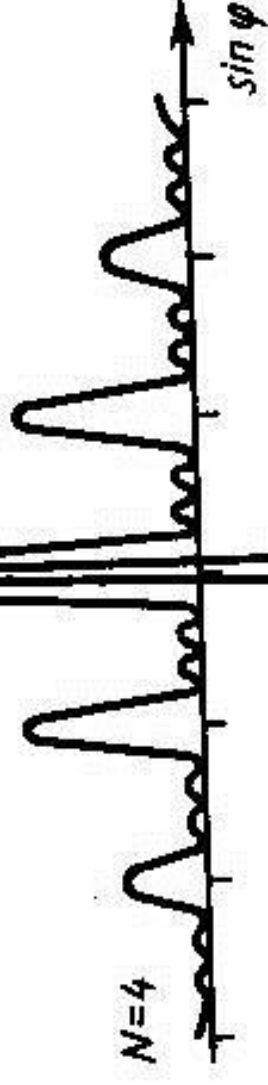
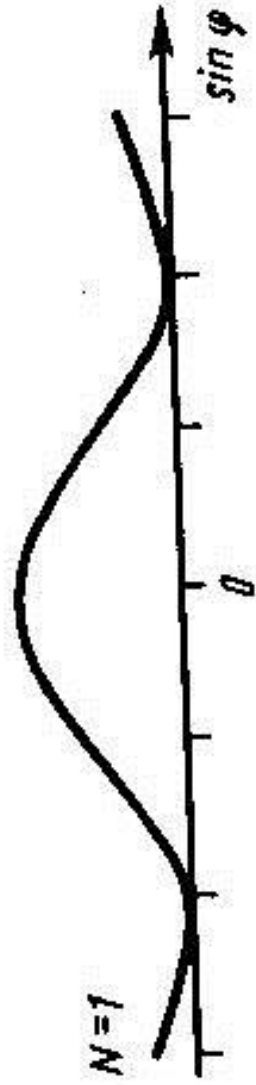
Difraksion panjaradagi difraksiya

$$d \cdot \sin \varphi = \pm 2k \frac{\lambda}{2}$$

($k=1,2,3,\dots$)

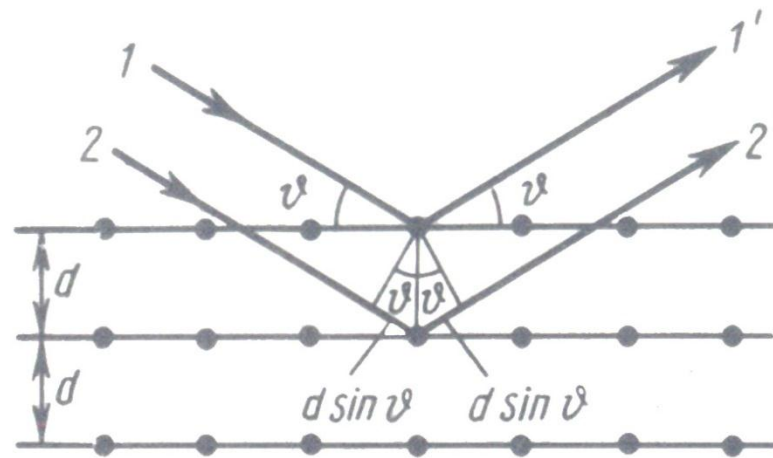






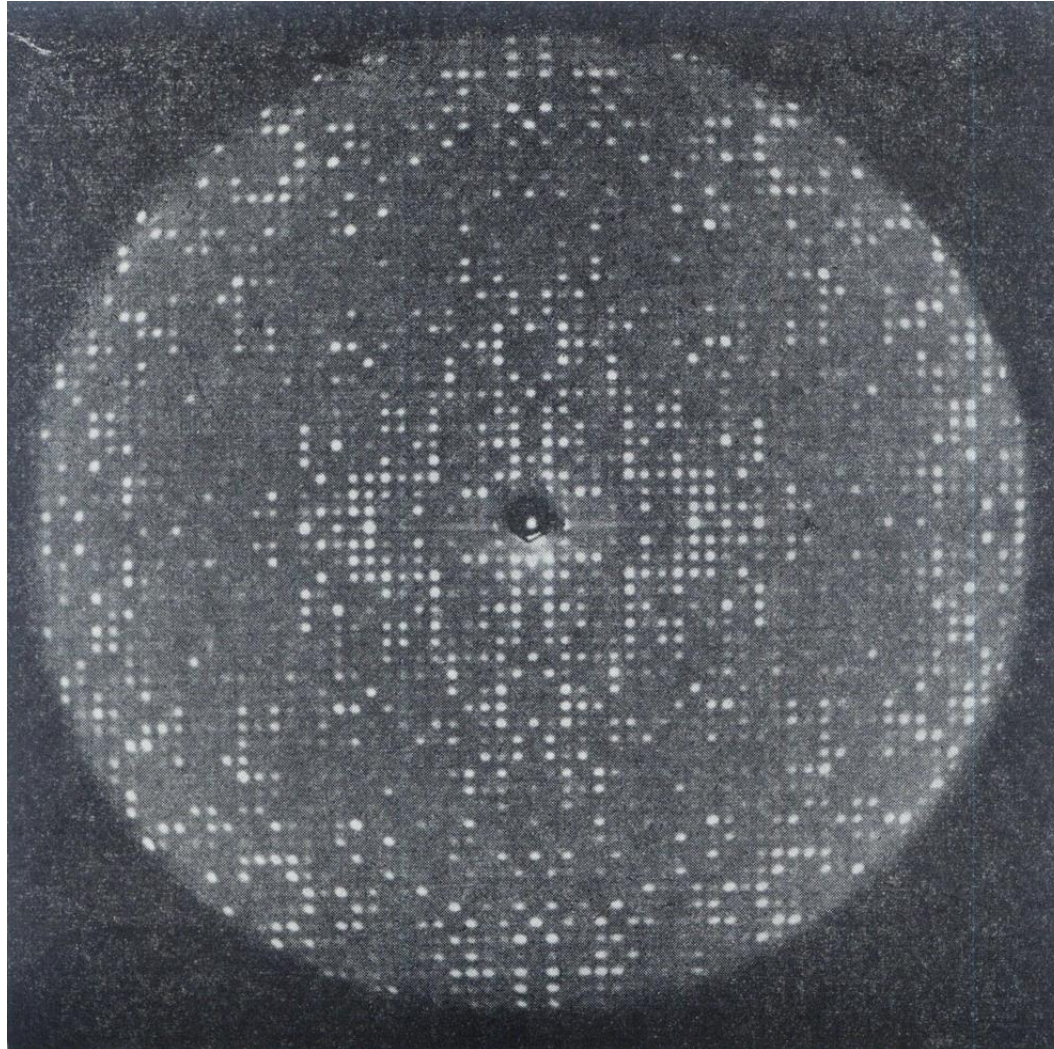
Rentgen nuri difraksiyasi

Rentgen nuri difraksiyasi

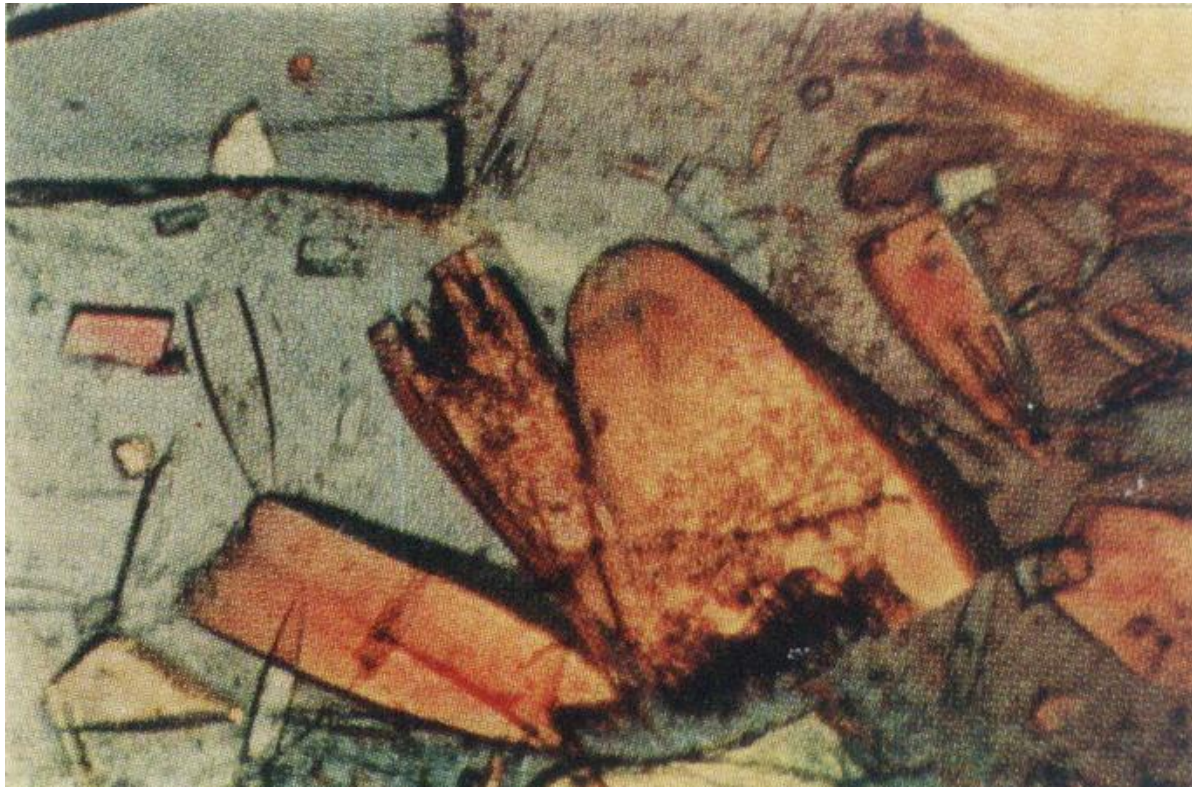


$$2d \sin \vartheta = k\lambda \quad (k=1,2,3,\dots)$$

Difraktogramma



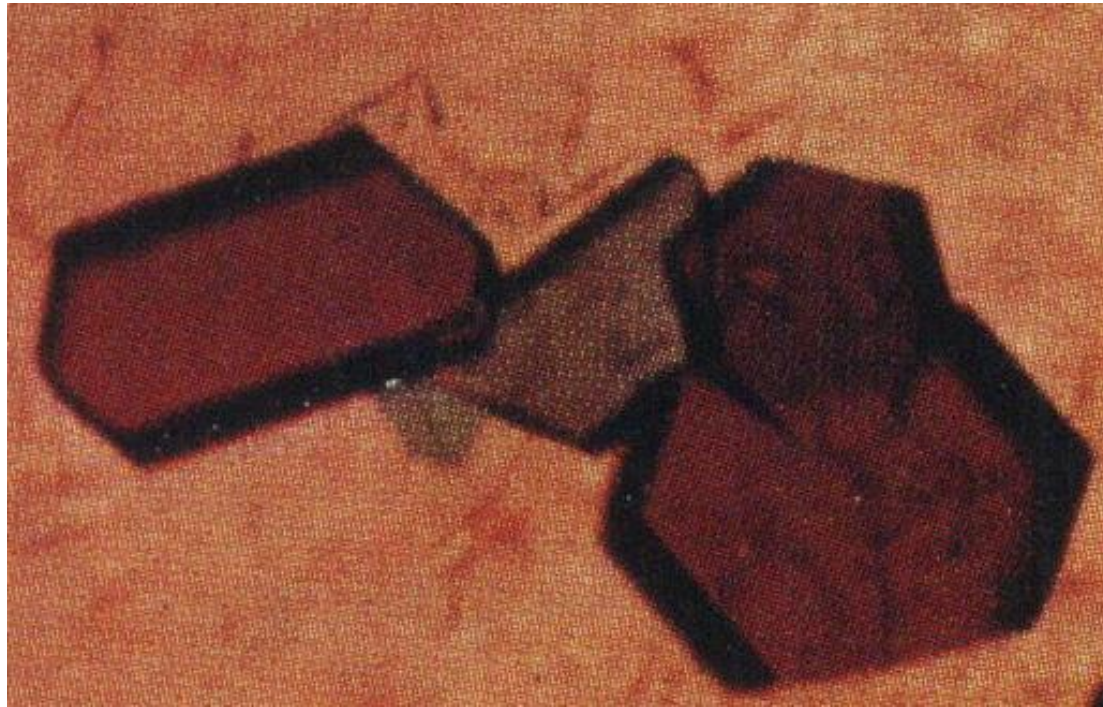
Moddani kristallari



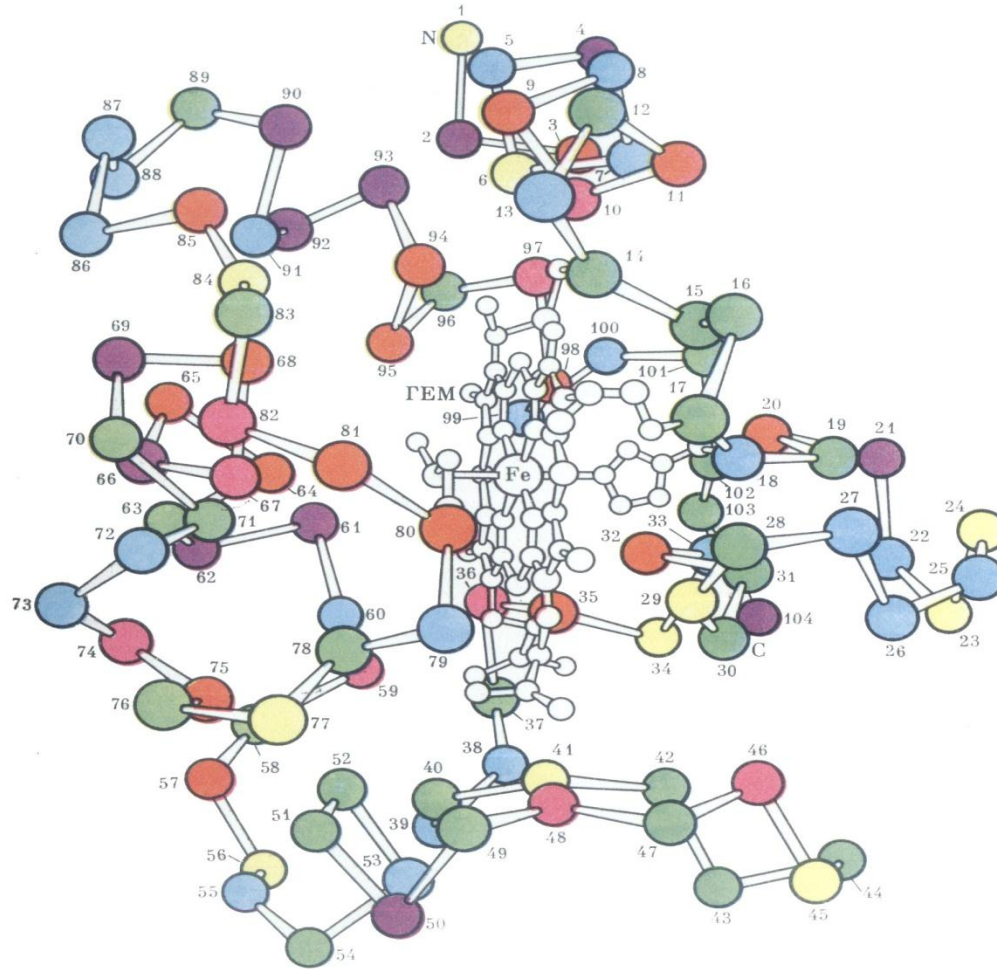
Kristal



Kristallar



Gemoglobin fazoviy strukturasi



Rentgen nurini olinishi

