分光计的调节和掠入射法测量折射率 ~~及光栅光谱仪 特性~~

一、测定玻璃三棱镜顶角.

i	1	2	~~3~~	3
~~(+360°)~~ θ_1'	41°55'	41°56'	~~116°30'~~	~~36°29'~~ 216°31'
~~(+360°)~~ θ_1''	221°59'	~~222°0'~~	~~330°31'~~	~~216°31'~~ 36°29'
θ_2'	~~161°58'~~	161°58'	~~216°31'~~	336°31'
θ_2''	341°59'	342°0'	~~36°29'~~ (+360°)	156°30'

i	1	2	3
θ_1'	41°55'	41°56'	216°31'
θ_1''	221°59'	222°0'	36°29'
θ_2'	161°58'	161°58'	336°31'
θ_2''	341°59'	342°0'	156°30'

$A=59°59'$

二、掠入射法测定三棱镜折射率.

i	1	2	3
θ_3'	216°30'	219°57'	208°7'
θ_3''	36°28' (+360°)	39°51' (+360°)	28°8' (+360°)
θ_4'	175°3'	178°30'	166°41'
θ_4''	355°4'	358°31'	346°47'
	41°25'30"	41°23'30"	41°23'30"

$\overline{\Phi}=41°24'40"$

$n=1.6732$

三、最小偏向角法测定三棱镜折射率.

Hg 绿光.

i	1	2	~~2~~	3
θ_5'	29°23'	~~29°1'~~	29°23'	29°26'
θ_5''	110°15'	~~109°53'~~	110°16'	110°9'
θ_6'	344°26'	~~344°26'~~	344°26'	344°28'
θ_6''	164°23'	~~164°22'~~	164°23'	164°25'
	54°5'30"		54°5'	54°4'

$\overline{\delta_m}=54°4'50"$

$n=1.6784$

	θ_5'	θ_5''	θ_6'	θ_6''
黄光1	110°42'	29°49'	164°26'	344°27'
黄光2	110°44'	29°50'	164°26'	344°27'
紫光	107°55'	288°1'	164°26'	344°27'

陈 (signature, red)

4.3

光栅特性及测定光波波长.

一. 测量光栅常数. (Hg绿 546.074nm)

级次k.	-2	-1	0	+1	+2	$\bar{\phi}_i$
θ_1	19°09'	22°53'	~~20°32'~~ 41°58'	61°2'	82°52'	19°5'15"
θ_1'	181°10'	202°55'	~~200°35'~~ 222°2'	241°7'	262°52'	
θ_2		22°51'	41°56'	~~61°0'~~ 61°0'		19°5'30"
θ_2'		~~202°52'~~ 202°52'	221°59'	241°5'		
θ_3		22°50'	41°56'	61°0'		19°6'15"
θ_3'		202°51'	221°59'	241°6'		

$\bar{\phi}_1 = 19°5'40'' \Rightarrow d_1 = \frac{\lambda}{\sin\bar{\phi}_1} = 1.6693\ \mu m.$

$\bar{\phi}_2 = 40°57'15'' \Rightarrow d_2 = \frac{2\lambda}{\sin\bar{\phi}_2} = 1.6696\ \mu m.$

二. 测量Hg黄线波长及光栅角色散率.

	θ_1	θ_1'	θ_2	θ_2'	θ_3	θ_3'	$\bar{\theta}_1$	$\bar{\theta}_2$	$\bar{\theta}_3$
黄1 -1	21°38'	201°40'	21°38'	~~41°58'~~ 201°39'	21°37'	201°39'	~~20°1'45"~~ 201°8'15"	201°8'30"	201°8'45"
黄2 -1	~~41°58'~~ 21°43'	~~221°59'~~ 201°45'	21°43'	201°44'	21°43'	201°43'	201°3'30"	201°4'	201°3'45"
0	41°56'	221°59'							
黄2 +1	62°8'	242°14'	62°9'	242°14'	62°8'	242°13'			
黄1 +1	62°12'	242°17'	62°13'	242°18'	62°13'	242°18'			

$\lambda_1 = d\sin\theta_1 = 579.37\ nm.$ $\lambda_2 = d\sin\theta_2 = 577.20\ nm.$

$D = \frac{\Delta\phi}{\Delta\lambda} = \frac{131.34''}{nm}$ $D = \frac{\phi}{d\cos\phi} = 131.72''/nm$

三. 测量光栅分辨本领.

缝宽 $x_1 = 19.305\ mm.$ $x_2 = 17.769\ mm \Rightarrow d = 1.536\ mm.$

$R = \frac{\lambda}{\Delta\lambda} = 982.$ $R' = kN = 920.$

R0分4.7