DIC100 Series Differential Interference Contrast Microscopy System

目录

1 System Principle

DIC (Differential Interference Contrast) microscopy system is designed with the principle of dual-beam polarization interference. The process is as follows:

1.After the linearly polarized light emitted from the polarizer passes through a Nomarski prism with birefringence properties, it is decomposed into two beams of polarized light that vibrate perpendicular to each other and have a certain phase difference;

2.After two incoherent beams of light are irradiated onto the sample, the slight unevenness or difference in refractive index on the surface of the sample in the field of view causes an optical path difference between the two beams of light. After being reflected by the sample, the two beams of light pass through the Nomarski prism and rejoin;

3.The merged light passes through the analyzer to make their vibration directions consistent and interfere;

4.The light and dark contrast of the sample details is enhanced due to the interference and amplitude changes of the light beam. At the same time, the sample detail image presents a three-dimensional relief-like effect.

The Nomarski prism can be adjusted horizontally, which acts like a phase-shifting compensator to change the brightness and interference color between the object and the background in the field of view, thereby achieving the ideal observation effect. **错误!未找到引用源。**is the DIC100 series differential interference microscope.

Figure 1 DIC100 Series Microscopy System

2 System Parameters

- Standard working distance series/Long working distance series objectives (optional);
- Tube lens: 1x (The focal length is 180 mm), different magnification tube lens can be customized;
- Image size: 25mm;
- Image wavelength: 400-700nm;
- Interface: C-mount;
- Illumination: Kohler illumination;
- Light source: 10W white /3W blue LED (optional);

Table 1 Standard working distance objective parameters (60mm parfocal length)

Order code	Magnification	NA	WD/mm	Focal length(mm)	Resolution(um)	OFOV(mm)	IFOV(mm)	Thread
DIC5XA	5X	0.15	23.5	40	2.2	5	25	M26*0.705
DIC10XA	10X	0.30	22.8	20	1.1	2.5	25	M26*0.705
DIC20XA	20X	0.40	19.2	10	0.8	1.1	25	M26*0.705
DIC50XA	50X	0.55	11.0	4	0.6	0.44	25	M26*0.705

Table 2 Long working distance objective parameters (95mm parfocal length)

Order code	Magnification	NA	WD/mm	Focal length(mm)	Resolution(um)	OFOV(mm)	IFOV(mm)	Thread
DICL2XA	2X	0.055	33.7	100	6.1	12.5	25	M26*0.705
DICL5XA	5X	0.14	33.6	40	2.2	5	25	M26*0.705
DICL10XA	10X	0.28	33.4	20	1.2	2.5	25	M26*0.705
DICL20XA	20X	0.34	29.5	10	0.8	1.25	25	M26*0.705
DICL50XA	50X	0.5	18.9	4	0.7	0.5	25	M26*0.705

3 Instructions for Use

Usually, the DIC microscope system received by the user has been calibrated and debugged. Users only need to rotate the DIC prism knob and adjust the relative position of the sample and the DIC prism (perpendicular or parallel to the DIC prism) to obtain the best observation results.

3.1 Polarizer/Analyzer Adjustment Instructions

As shown in Figure 2:①Polarizer locking screw (Allen wrench size is 1.5 mm), used to fix the position of the polarizer;②Polarizer lever, used to adjust the angle of the polarizer (The transmission axis of the polarizer is perpendicular to the polarizer lever);③Analyzer locking screw (Allen wrench size is 1.5 mm), used to fix the position of the analyzer;④Analyzer lever, used to adjust the angle of the analyzer (The transmittance axis of the analyzer is parallel to the analyzer lever).

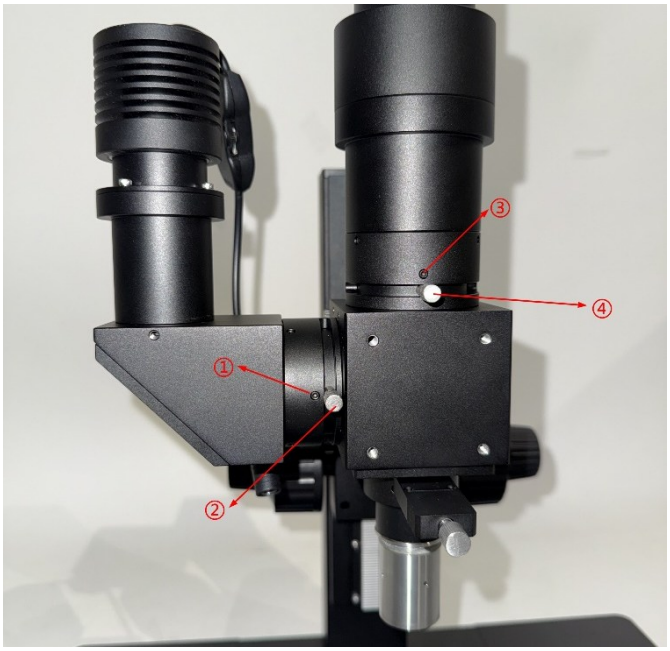

Figure 2 Schematic diagram of polarizer and analyzer adjustment instructions

3.2 DIC Prism Adjustment Instructions

As shown in Figure 3,①DIC prism box;②DIC prism box locking screw (Allen wrench size is 2 mm);③ Objective adapter ring locking screw (Allen wrench size is 1.5 mm);④DIC prism knob, used to adjust the prism move.

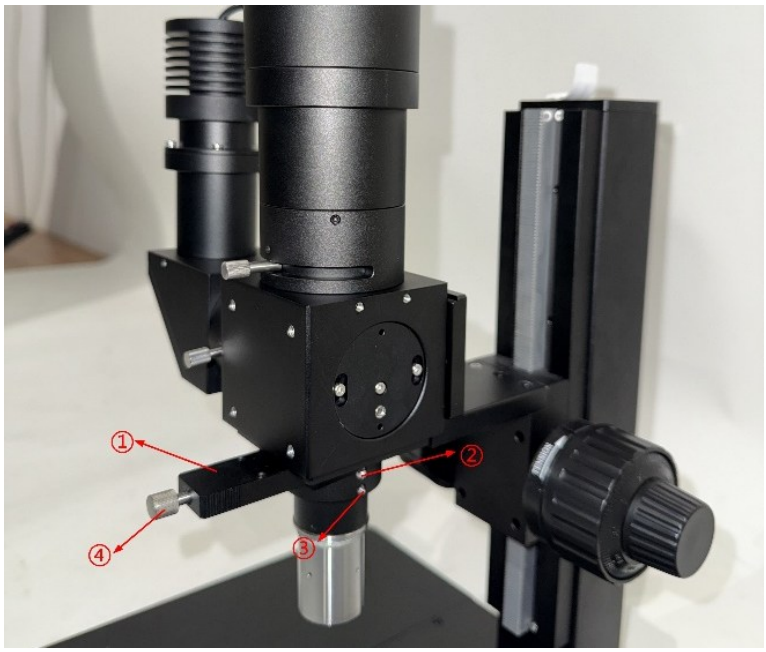

Figure 3 Schematic diagram of DIC prism adjustment instructions

4 Dimensions

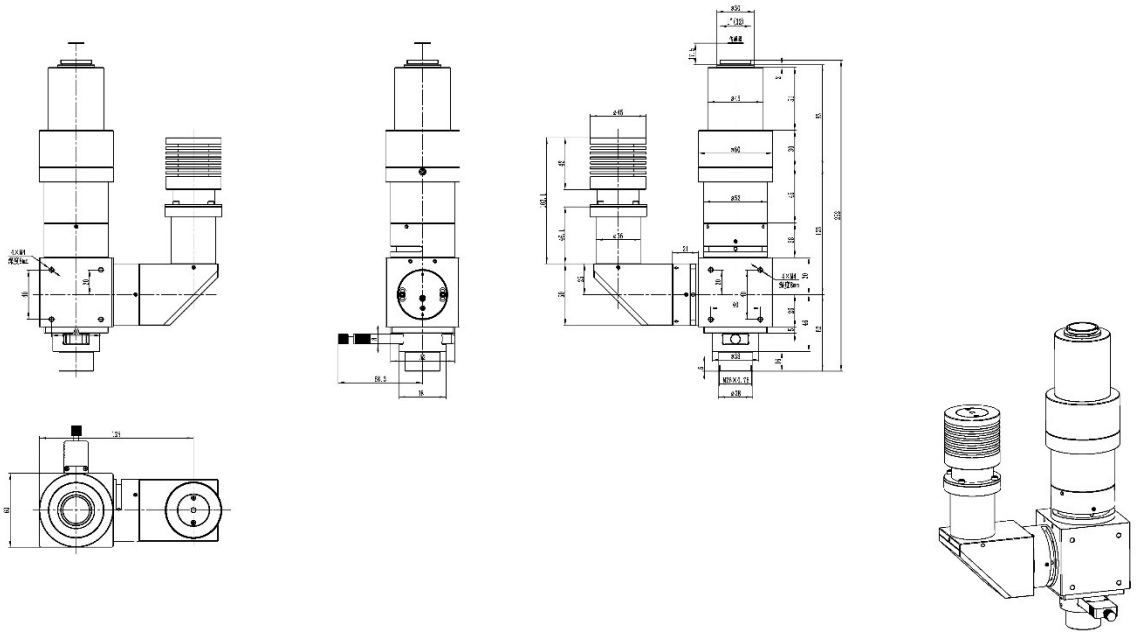

Figure 4 DIC100 Series Microscopy System Dimension

5 Application

5.1 Conductive Particle Detection of LCD/OLED

The number of conductive particles in the LCD circuit is the key to determining its conductive performance. Fewer conductive particles will reduce the conductive performance of the circuit and may cause display failures on the LCD screen; too many conductive particles will cause waste of raw materials. In addition, the presence of adhering conductive particles in the circuit will have a greater impact on particle counting, causing the calculated number of particles to be less than the actual number, affecting the accuracy of the detection results.

Figure 5 is an image of conductive particles on an LCD screen taken using a DIC microscope system; Figure 6 is an image of the same position on the LCD screen taken using a metallographic microscope system. In Figure 5, the outline of the conductive particles is clearly visible, but in Figure 6, the conductive particles cannot be observed by the metallographic microscope system.

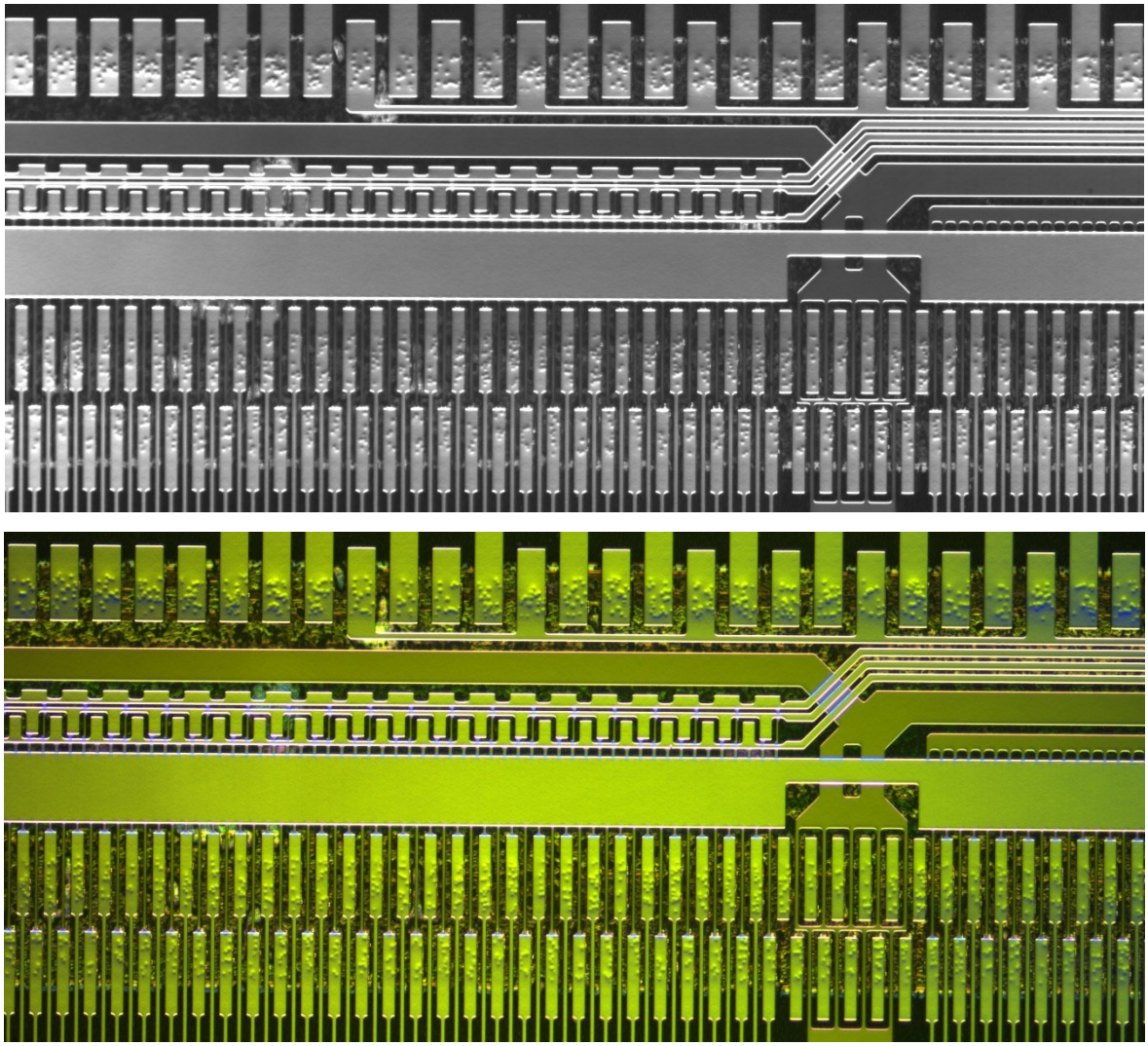

Figure 5 DIC100 series microscopy system shoots conductive particles on the LCD screen
(top) blue LED lighting + black and white camera; (bottom) white LED lighting + color camera

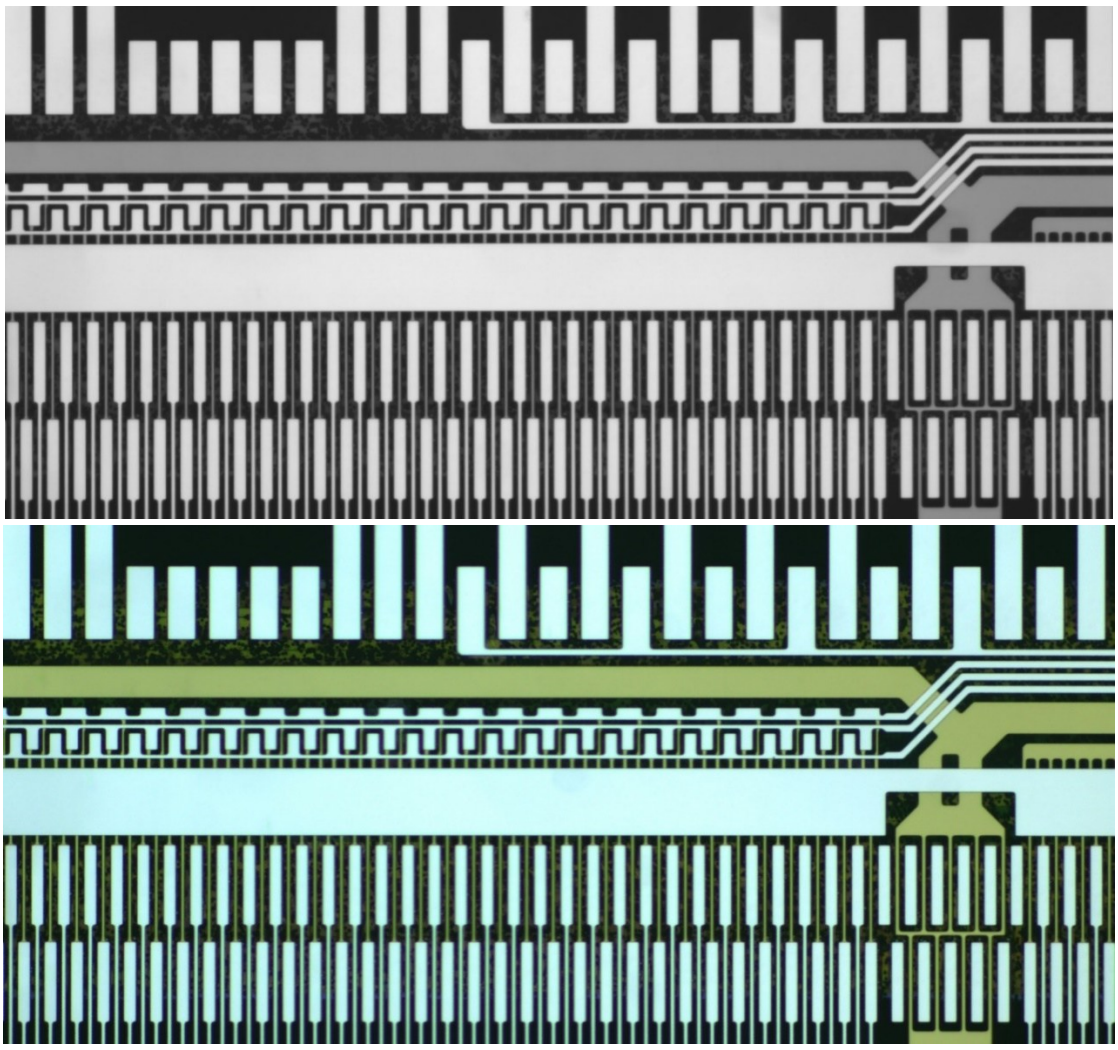

Figure 6 Metallographic microscope system shoots LCD screen
(top) blue LED lighting + black and white camera; (bottom) white LED lighting + color camera

5.2 Sample Surface Crack and Defect Detection

As one of the powerful detection and analysis methods in modern material metallographic examination, Differential Interference Contrast microscopy has many advantages, including relatively low requirements for sample preparation and an obvious sense of relief when observed under the microscope.

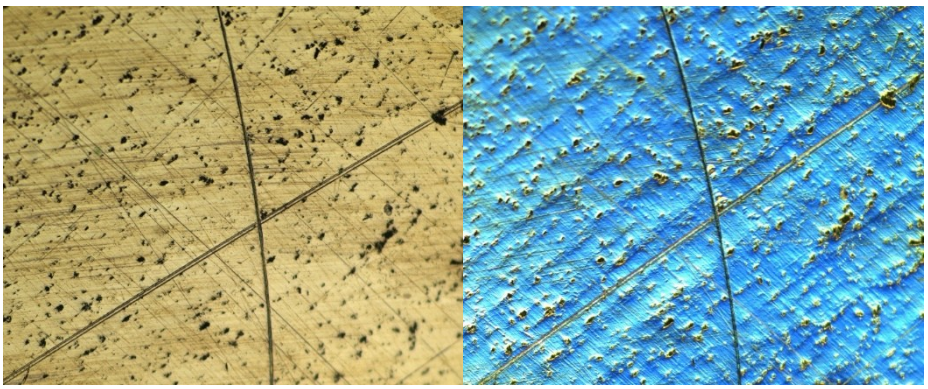

Figure 7 Pictures of metal surface
(left) Taken by metallographic microscope system; (right) Taken by DIC100 series microscope system

On the left of Figure 7 are fine structures or defects that are not visible or almost invisible in the incident light field under a regular metallographic microscope, while on the right of Figure 7, they can be easily observed using the DIC100 series differential interference phase contrast microscopy system. And the DIC100 series differential interference phase contrast microscopy system can also observe the details of particles, pores, cracks, and uneven contours in the sample, making material analysis more reliable.

5.3 Microbial Cell Detection

DIC100 Series Differential Interference Contrast microscope system can conduct non-destructive detection of activity of living cells. According to the effect of optical staining, it can debug images with different interference colors; change the focal length to obtain clear images at different levels; with high resolution, it can clearly display the intracellular contours. structure.

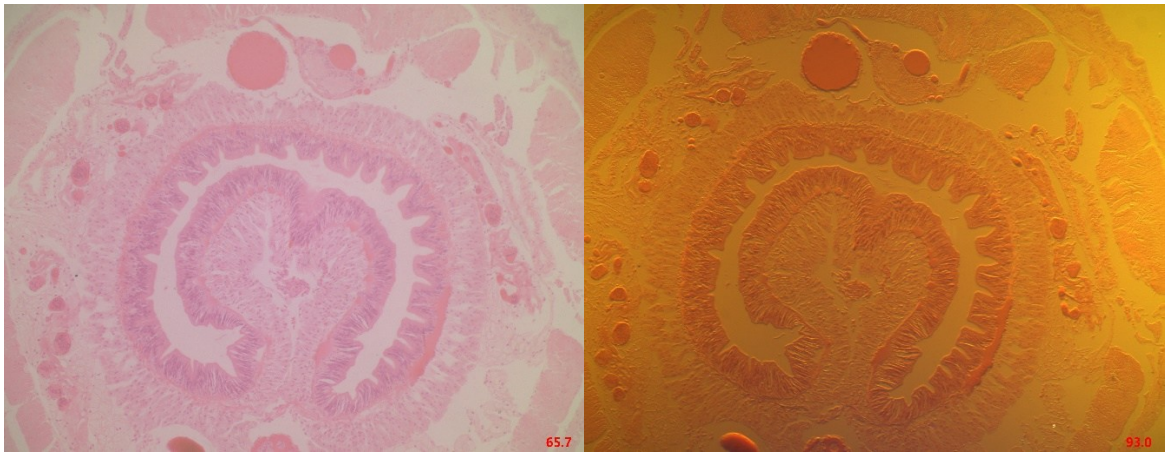

Figure 8 Pictures of Earthworm biological slices
(left) Taken by biological microscope system; (right) Taken by DIC100 series microscope system

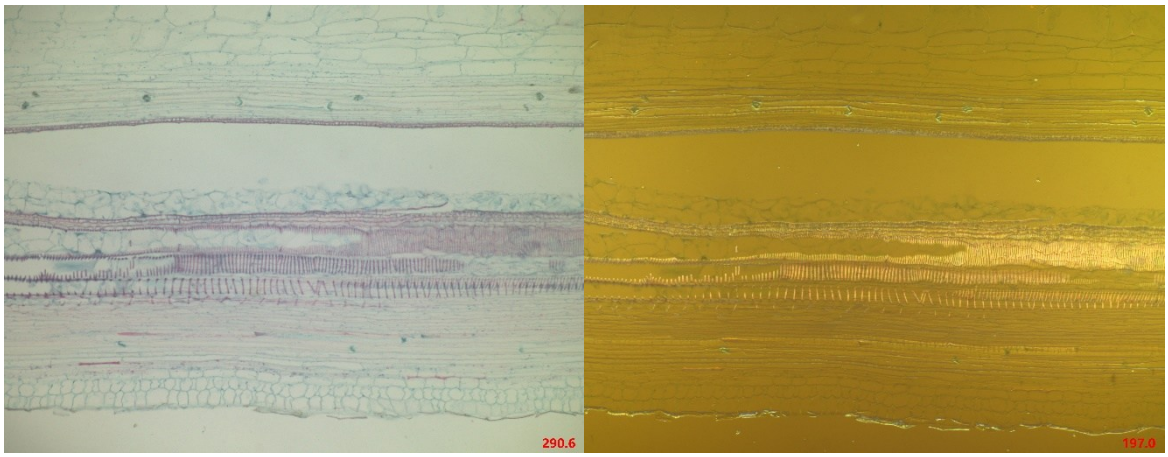

Figure 9 Pictures of Cucurbit Stem biological slice
(left) Taken by biological microscope system; (right) Taken by DIC100 series microscope system

6 Contact information

	杭州图谱光电科技有限公司	
	杭州市西湖区西园五路 6 号奥强大厦 1 号楼 15 层	
	杭州, 310030, 浙江,	
	中国	
	Hangzhou ToupTek Photonics Co., Ltd	
	15F, Aoqiang Building 1, No. 6, Xiyuan 5th Rd.,	
	Hangzhou, 310030, Zhejiang,	
	P.R.China	
	+86-571-8111-0735 +86-571-8111-0730 +86-571-8810-2638, +86-18058780750 (手机/Mobile Phone)	
	FAX: +86-571-8668-3738	
	tphz@touptek.com	
	Skype:	18058780750/ToupTek Photonics
	Q Q	2426878316
	Wechat	18058780750