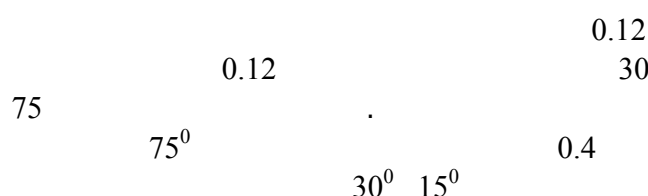


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Aabstract

In this work a laser scanning setup was designed and constructed by using Laser speckle technique, in which a linear relationship between Laser speckle Contrast and surface roughness. During the work standard stainless steel rough Surface was been used. From the results it is found that incident angle HAS a great influence on the measurements and this due to the saturation phenomena. For Incident angle (15°) saturation takes place with (R=0.12 μm) AND for more roughness the contrast decreased. When the incident angel become (30°) the contrast saturated at (R= 0.12 μm) and stay constant for more roughness. At angle (75°) saturation in CONTRAST TAKES place at (R=0.4μm) and the value of contrast less than that of 15° and 30° angles.

, (4,3)

NON CONTACT)
SCANNING, MEASUREMENT AND
(INSPECTION

-1-

.(7-5)

,(2,1)

2008 , 9 , 26 ,

,

, (14,13,10) ())

(DEVIATION

()

, (17,16,15,8) WAVINESS)

-: (19,18,13) } , (8){ (

.1 .(9) {

}

. (10) {

.2

) () }

(8){

.

} (SURFACE FLOW)

)

CONTACT LESS-) - .(10) (CRACKS OR SCRATCHES

. (OPTICAL METHOD

-3-1

(R)

-2- 1

:

,

,

,

.(22-18,13,12)

,(11,8)

(24-21,11)

,

,

,

. (12,8) .

((h))

د

($\Delta\phi$)

)

(Δr)

(h)

(

):-

(Δr)

(31,29,19,7,1

الحاصل .

$$\Delta r = 2h \sin \phi i \dots\dots\dots (5-1)$$

. ()

-:

($\Delta\phi$)

(π)

$$\Delta\phi = \frac{2\pi}{\lambda} \Delta r \dots\dots\dots (6-1)$$

($0 \leq \Delta\phi \leq \pi$)

(λ)

(5-1)

(6-1)

($\frac{\pi}{2}$)

-:

(7-1)

$$\Delta\phi = 4\pi \frac{h}{\lambda} \sin \phi \dots\dots\dots (7-1)$$

(7) -:

$$h < \frac{\lambda}{8 \sin \theta} \dots\dots\dots (18-1)$$

($\Delta\phi, h, \lambda, \theta$)

($\Delta\phi, h$)

, (θ, λ)

{

}

-:

(7)

((h))

($\phi = 0$)

-1

$$\left(\frac{h}{\lambda} \rightarrow 0 \right) \quad -2$$

$$\left(\dots, \frac{\pi}{8}, \frac{\pi}{4} \right) \quad 7)$$

S)
(SCATTERING COEFFICIENT) (

.1

.2

TOTAL SCATTERING

. (tis) **INTEGRATED**

1-2

S)
{
(E_s)

. { (E_R)

(LASER SPECKLE)

$$s = \frac{I_{ES}}{I_{ER}} \dots \dots \dots (19-1)$$

وبذلك يكون شرط الخشونة للسطوح الموصلة كهر بائيا هو :-

SPECKLES) ()
(13,2) . (PATTERN

$$|S| \leq 1$$

-2
-:

) ,
(
, (13)

13,3)

. ()
, .

2008 年 9 月 26 日

，
(0.1 μm)
(30°)
(H) (0.1 μm)
(80°)
(C) (0.4 μm

，
()
(0)
()
(15-1)
(25)

(37-33,13) -:
(1)
-2
SPECKLE ()
CONTRAST
STANDARD DEVIATION
-: (I)
$$\langle I \rangle = \frac{I_1 + I_2 + I_3 + \dots + I_N}{N} \dots (21-1)$$

-: - -2
$$\sigma = \sqrt{\langle I^2 \rangle - \langle I \rangle^2} \dots (22-1)$$

;
(SCANNING
(C)
(UNILITE SERVO- MOTOR CONTROL

2008 年 9 月 26 日

(15CM) (FOCAL LENGTH)
Optical
-2
filter
(110v) (220v)
, (630NM-680NM)
(INTERFERENCES FILTER
(672NM)
(I₀)
.1
670NM)
(LASER DIODE)
(672NM)
(40,29,2) (G a s
(tem₀₀)
.DETECTOR (SENSOR)
(<5MW)
(4.5v)
(635-680Nm
.1
-2
- -2
.2
()
()

,

(2)

(25CM)

(
(75° - 10° -)

(5MM) تكون (120°)
(x)
15°) -1
(0.025 μm) (()
(0.023468)
(0.12 μm) (0.4998 (180°)
(0.16 μm) (0.31415)
(0.2418)
(3) (0.25 (7CM)
(1) ()
(0.12 μm)

(5) (4)
(0.025 μm) , (0.05 μm)
(0. (

عناصر السطح , ولكن عند رسم مخططات الجانبية للسطوح (μm) . (75° - 10°)

0.16 و (0.25 μm) على التوالي تبين إن شكل وهيئة المخطط تبدأ

بالاقتراب من السطوح ذات الخشونة الأقل وهذا بسبب تأثير

(0.12 μm) (0.025 μm) (75⁰)
(2) .)
(75⁰) - . (0.12 μm)
)
0.4 μm (75)
0.4 μm)
((0.12 μm) ,
(75⁰)
) (9) (0.07988) ,
(0.025 μm) (0.4722) (0.12 μm)
(0.4 μm))
(
(75⁰)
(3) (30⁰) (15⁰) (75⁰)
(
) ()
)
(11) (10
(0.12),(0.025
(30⁰) -2
-4
-1 (0.12 μm)
(6)
(0.12 μm)
-2
-3 (8) (7)

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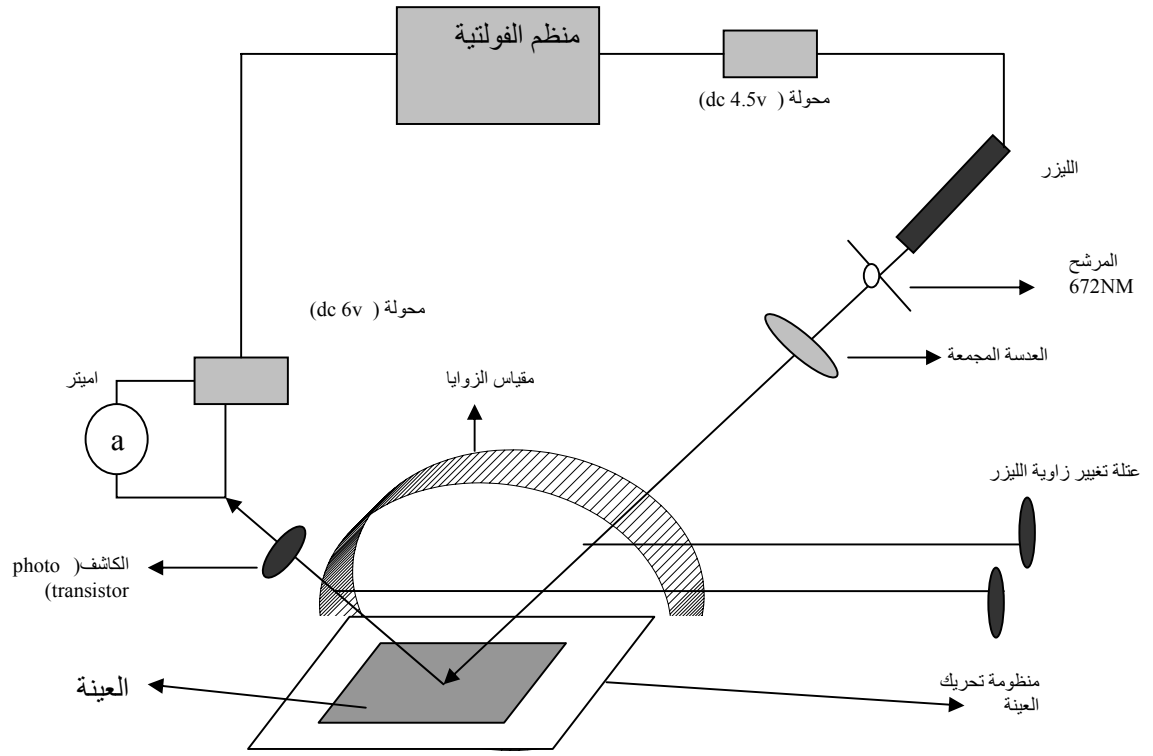
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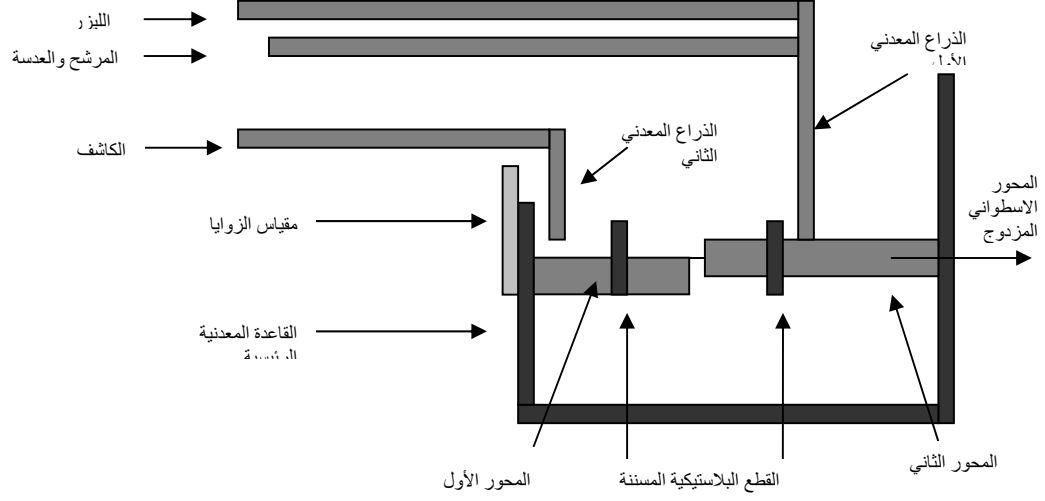
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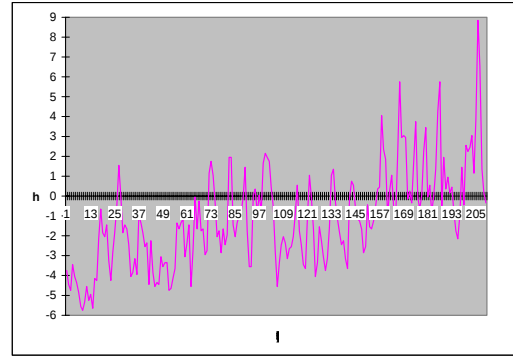
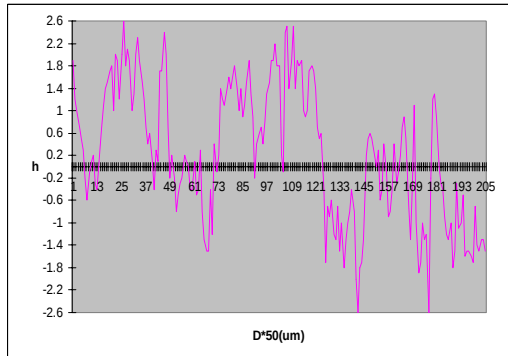
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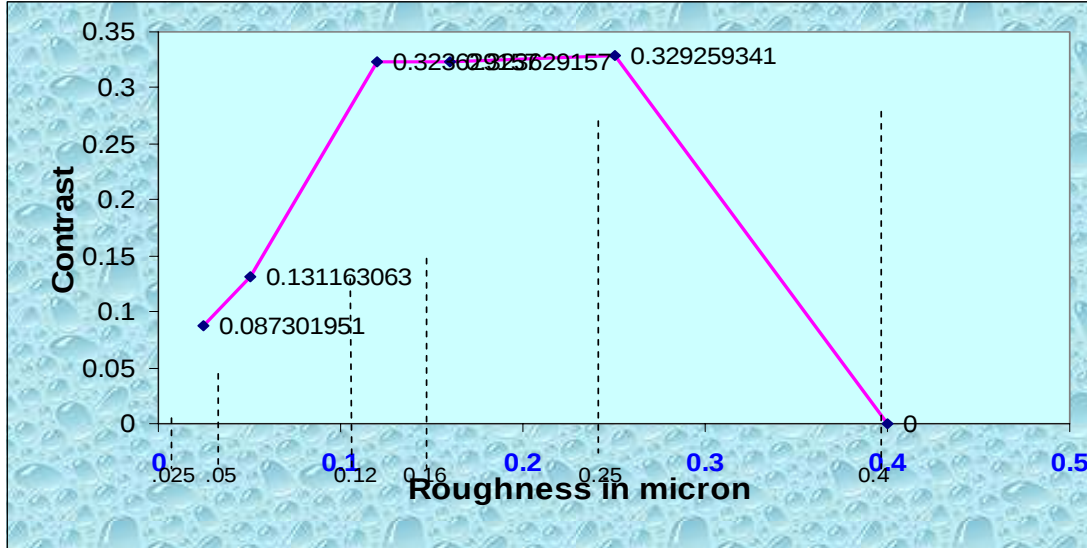
الشكل (1) يبين مكونات المنظومة الليزرية الماسحة



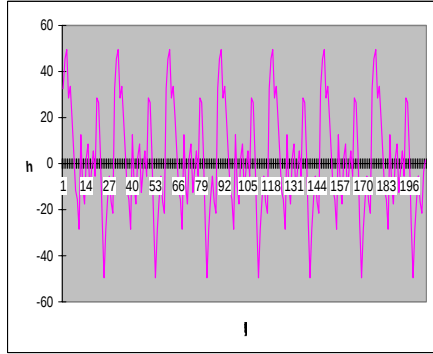
شكل رقم (3) المنحنى المرجعي عند الزاوية 15^0



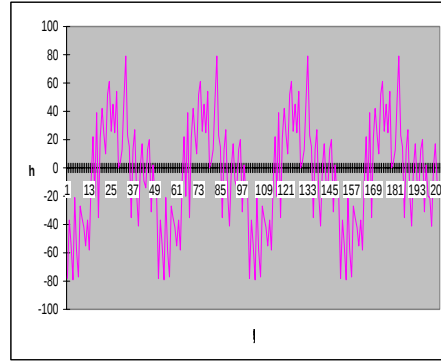
شكل (4): مخطط جانبية السطح ($0.025 \mu m$) عند الزاوية (15°) شكل (5): مخطط جانبية السطح ($0.5 \mu m$) عند الزاوية (15°)



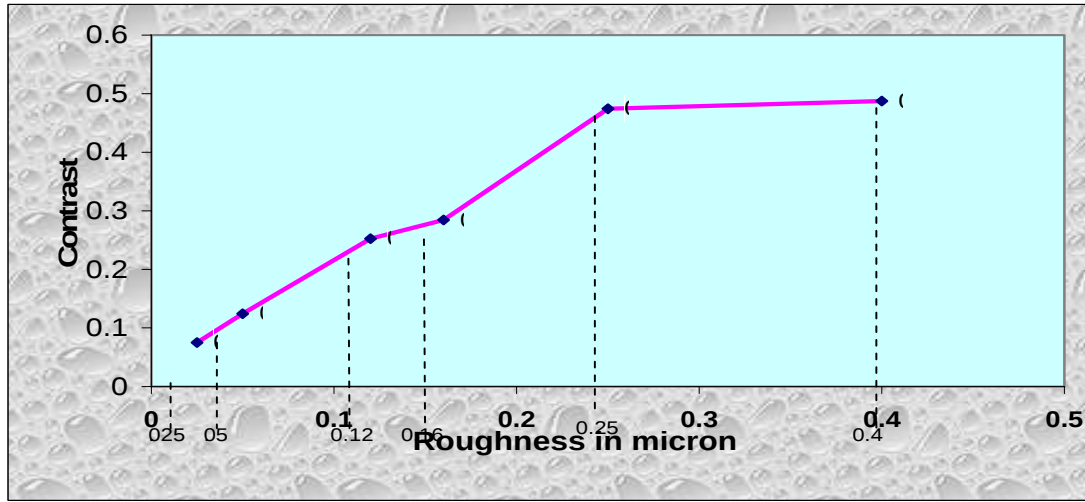
شكل رقم (4-7): المنحنى المرجعي عند الزاوية (30^0)



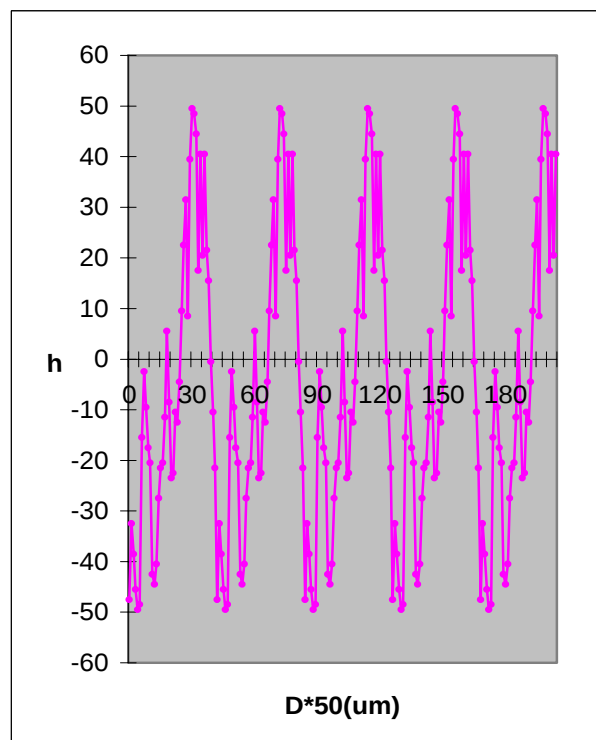
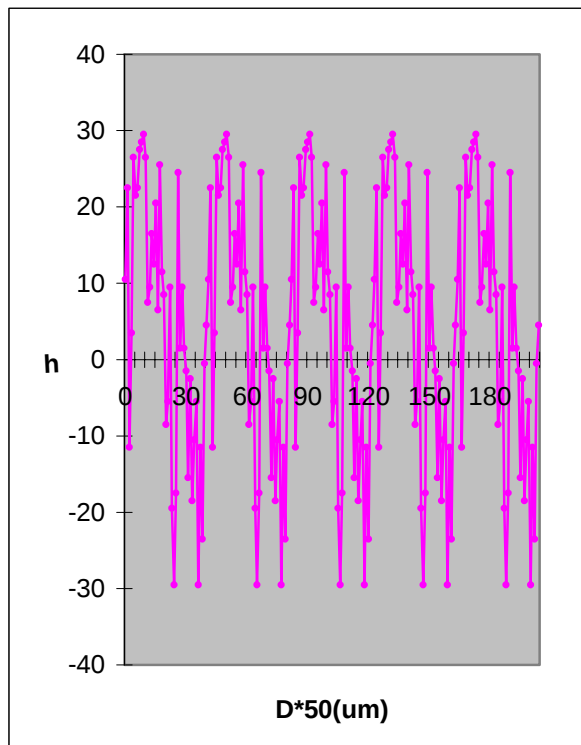
شكل (7): مخطط جانبيه السطح ($0.025 \mu m$) عند الزاوية (30^0)



شكل (8): مخطط جانبيه السطح ($0.12 \mu m$) عند الزاوية (30^0)



شكل رقم (9): المنحنى المرجعي عند الزاوية (75^0)



شكل (10): مخطط جانبيه السطح ($0.025 \mu m$) عند الزاوية (75^0) شكل (11): مخطط جانبيه السطح ($0.12 \mu m$) عند الزاوية (75^0)