



Conference: Congreso Interdisciplinario de Energías Renovables -  
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# Title: Optomecatrónica de micro-procesamiento láser para fabricación de guías de onda ópticas

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**Editorial label ECORFAN:** 607-8534  
**BCIERMMI Control Number:** 2018-03  
**BCIERMMI Classification (2018):** 251018-0301

**Pages:** 16  
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**RNA:** 03-2010-032610115700-14

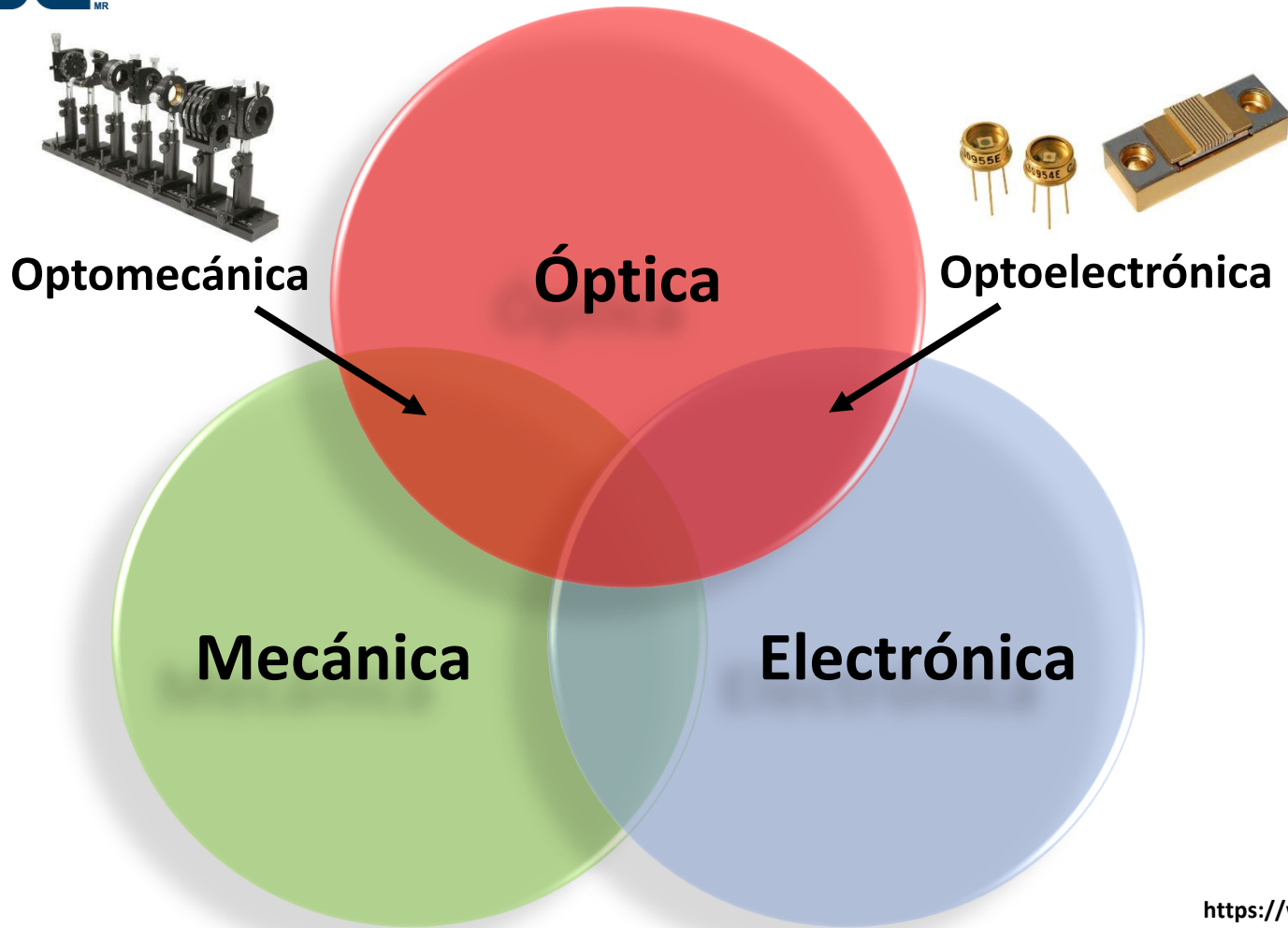
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# Optomecatrónica



Áreas de aplicación: Automotriz, aeroespacial, manufactura, procesamiento de materiales, biomédica, etc.

# Exámenes de laboratorio

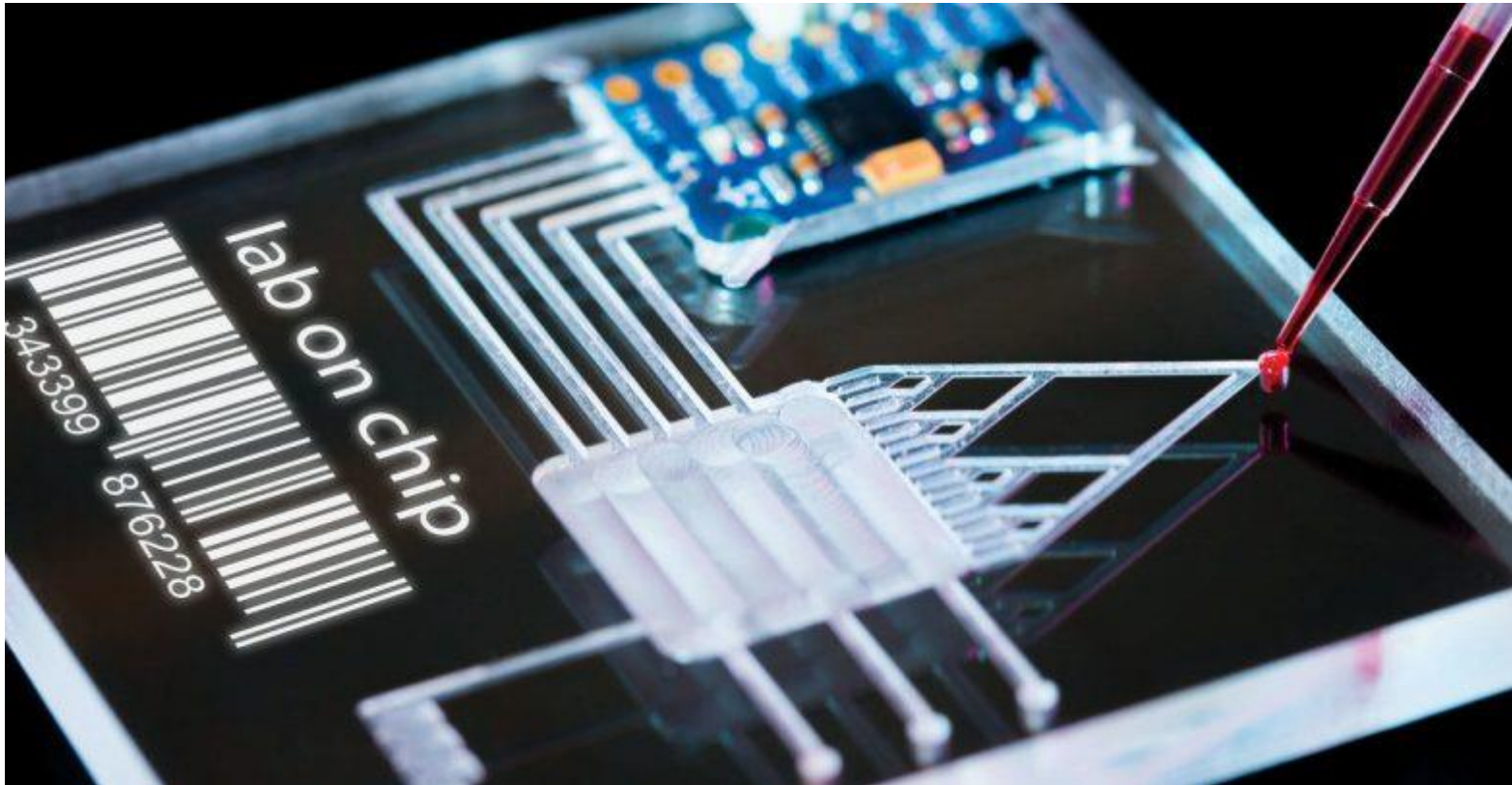


[<http://ndsnoticias.com>]



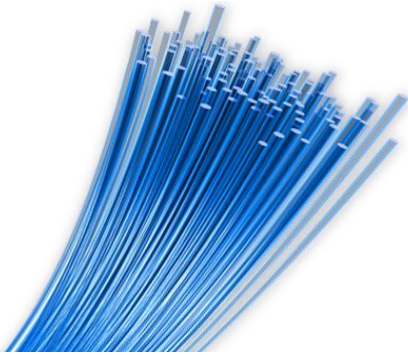
[<https://www.natursan.net>]

# Lab-on-a Chip

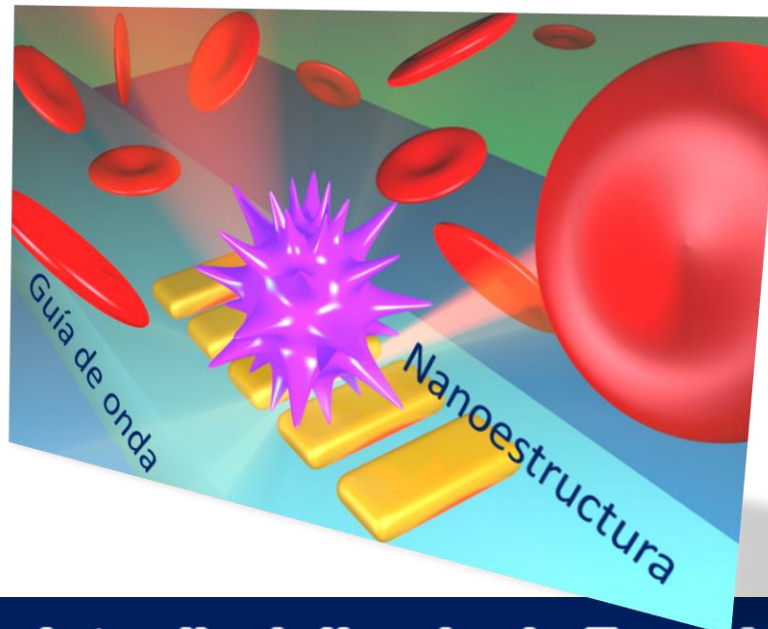


[<https://dailyindustryreports.com>]

# Guías de onda ópticas



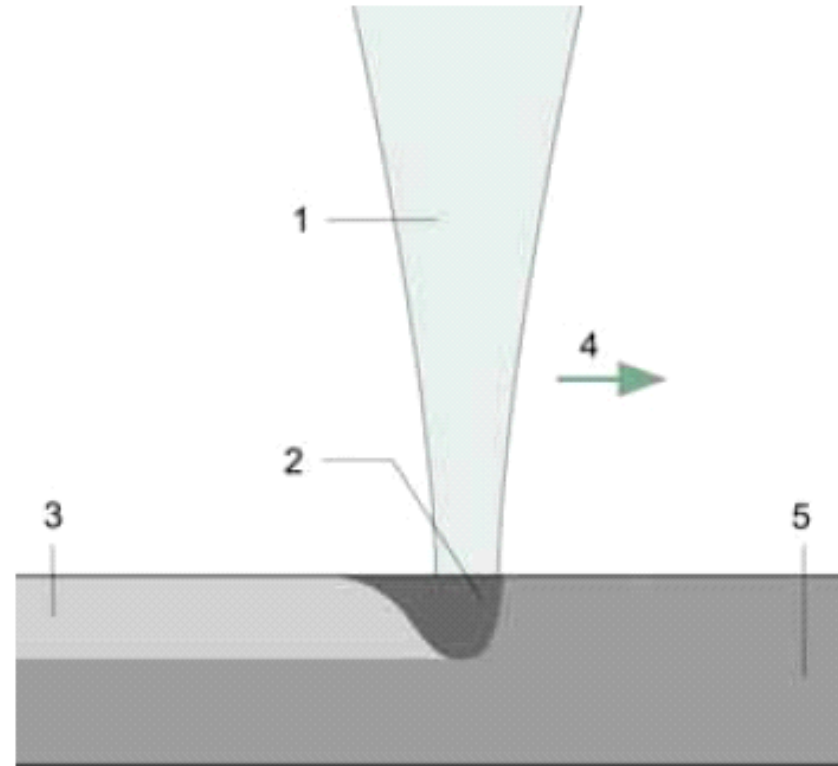
[<https://conceptodefinicion.de/fibra-optica/>]



# Tratamiento térmico superficial

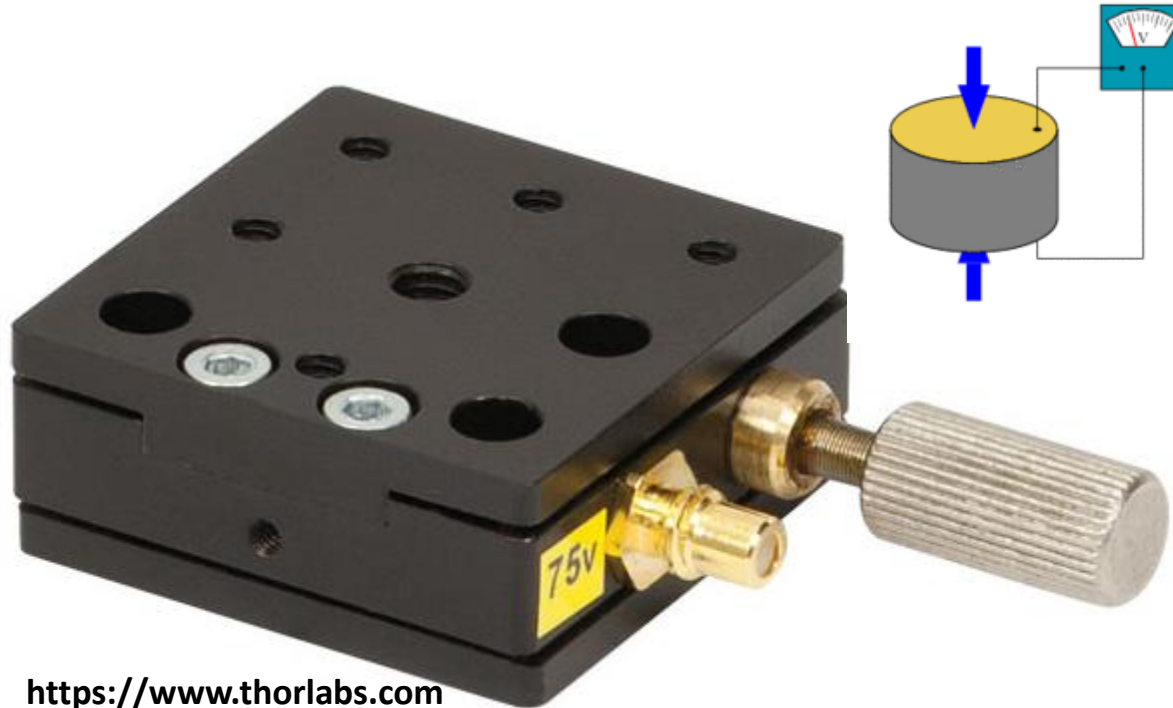
## Derretimiento

1. Haz láser
2. Zona caliente
3. Zona tratada
4. Dirección del proceso
5. Sustrato



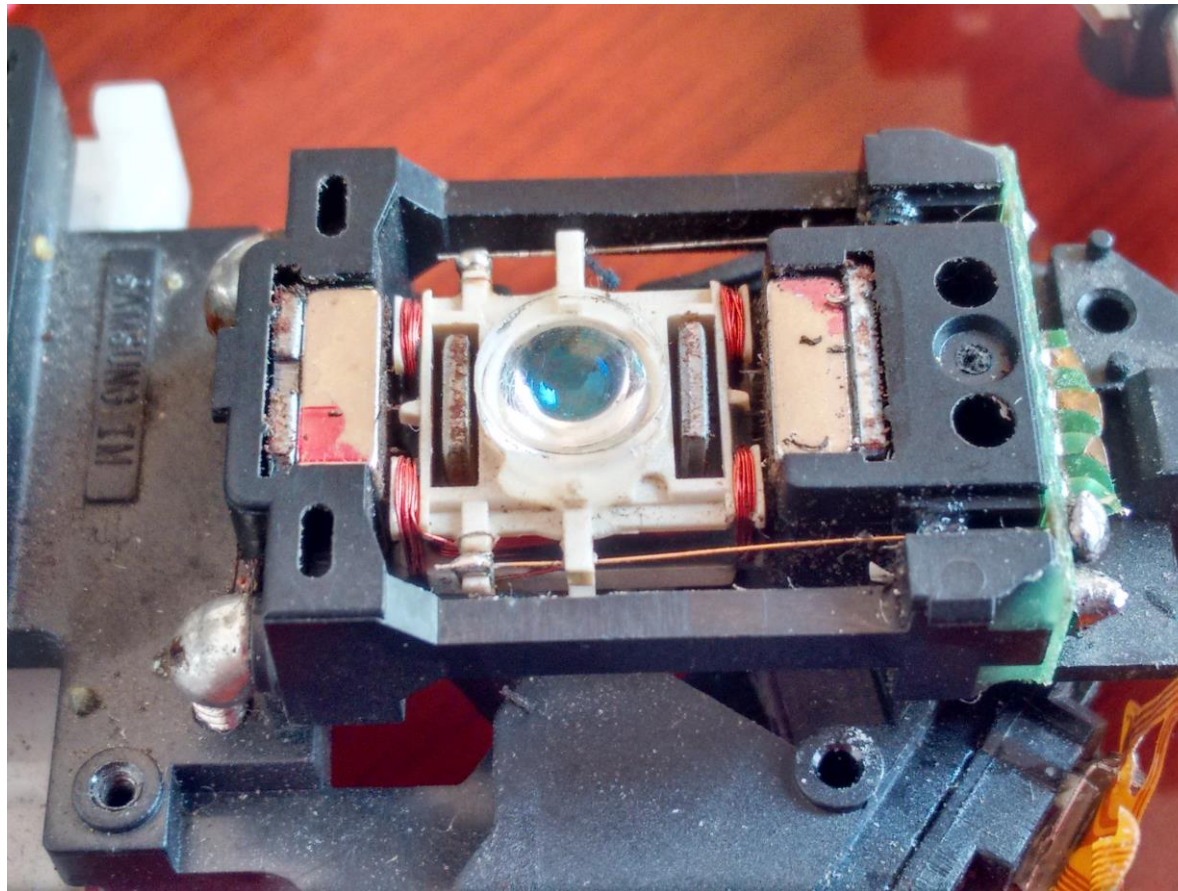
# Nano movimiento

(Actuador piezoeléctrico)



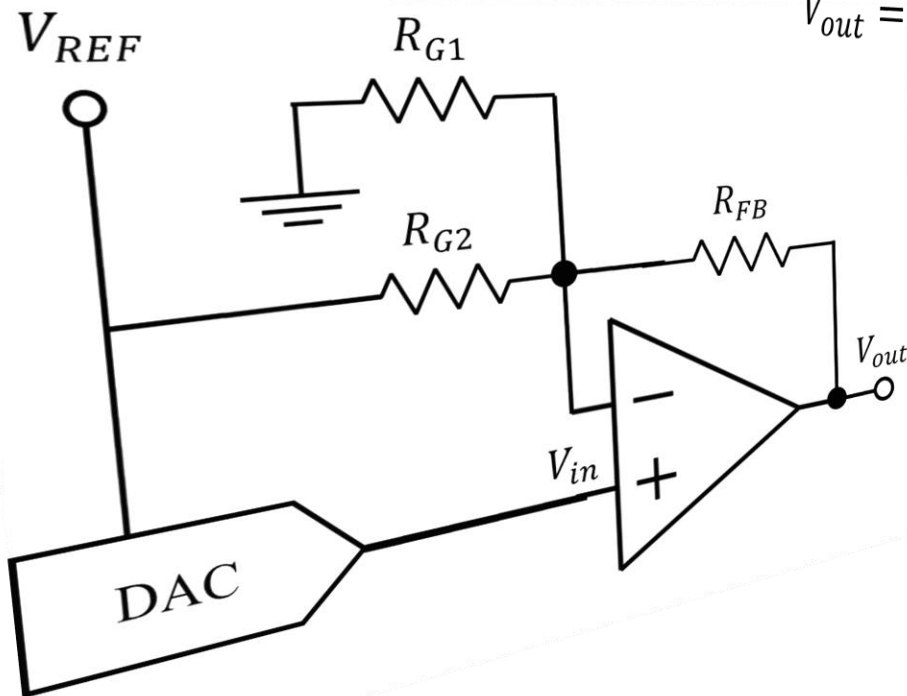
<https://www.thorlabs.com>

# Lector de disco óptico





# Voltaje unipolar a bipolar



$$V_{out} = \left( 1 + \frac{R_{FB}}{R_{G2}} + \frac{R_{FB}}{R_{G1}} \right) V_{in} - \frac{R_{FB}}{R_{G2}} V_{REF}$$

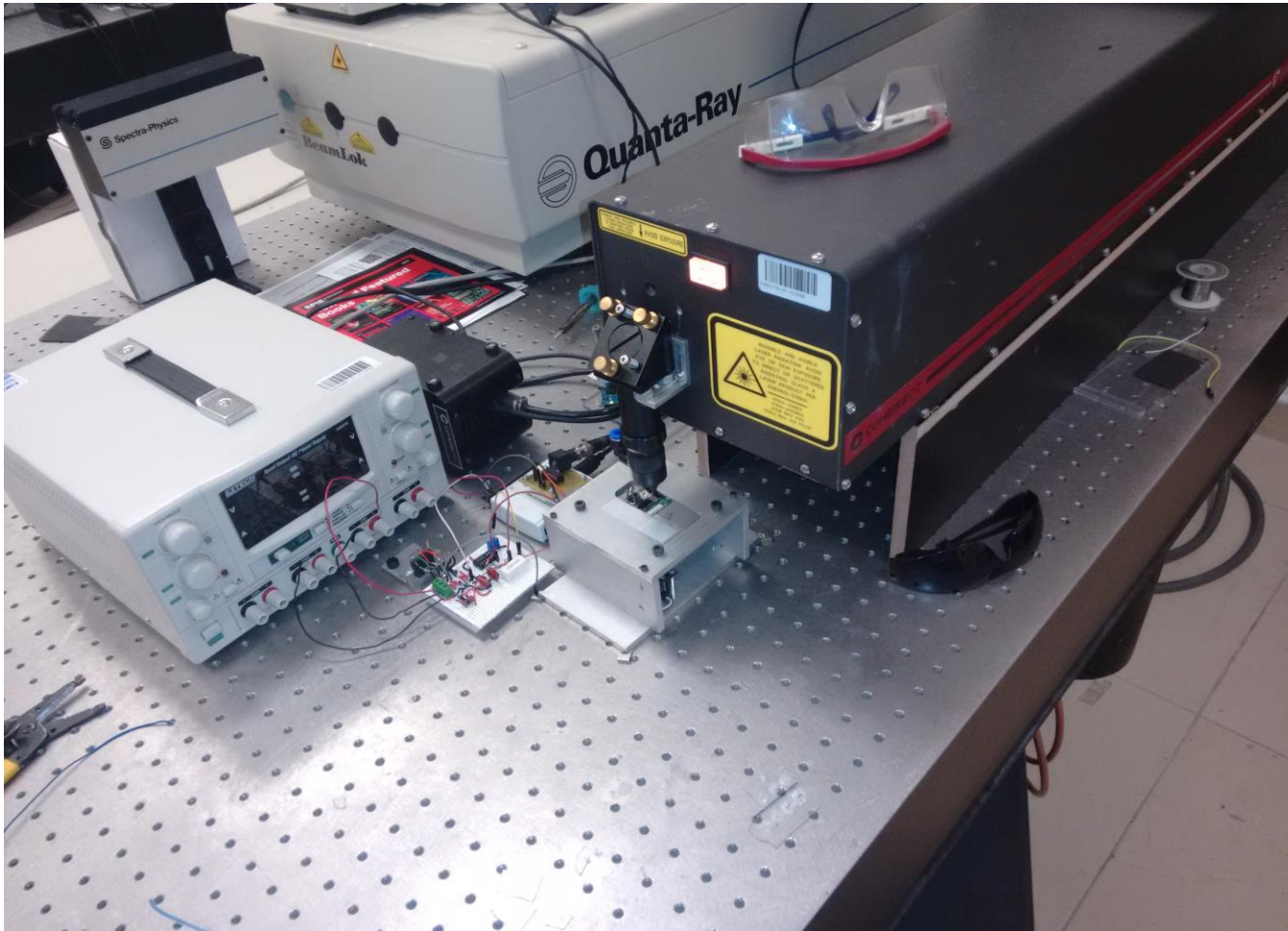
$$V_{out} = \pm 2V_{REF}$$

$$R_{G1} = R_{FB},$$

$$R_{G2} = R_{FB}/2.$$

[Duke, K. (2013) Texas Instruments Inc.]

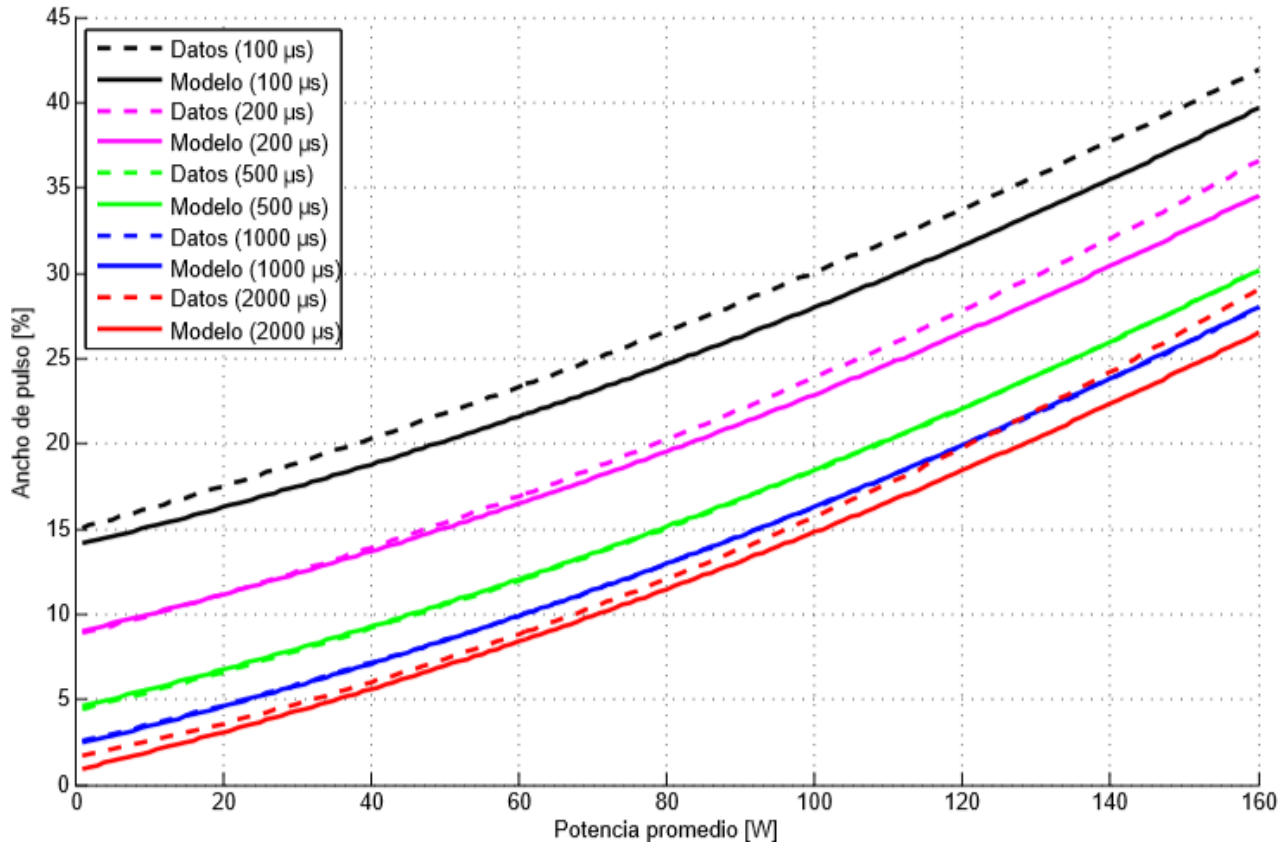
# Arreglo experimental



# Control láser

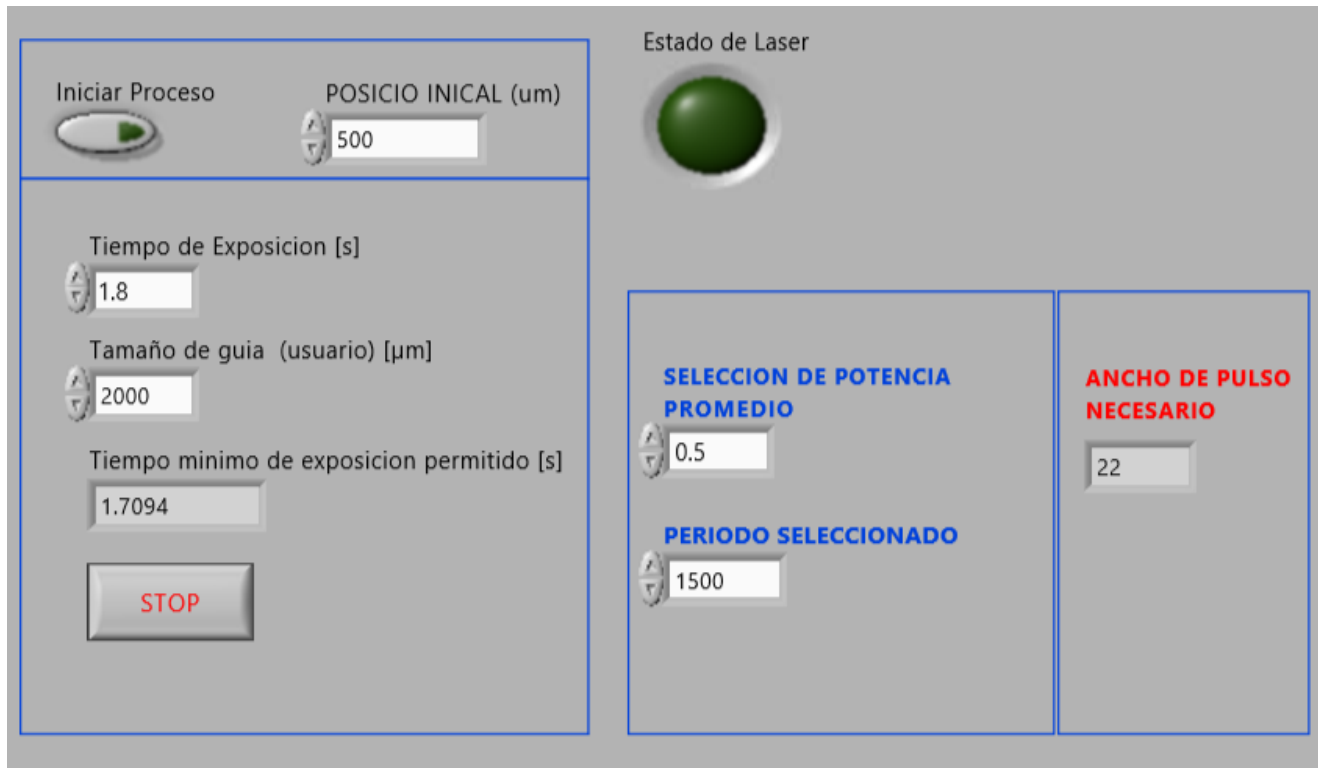


# Gráficas de potencia

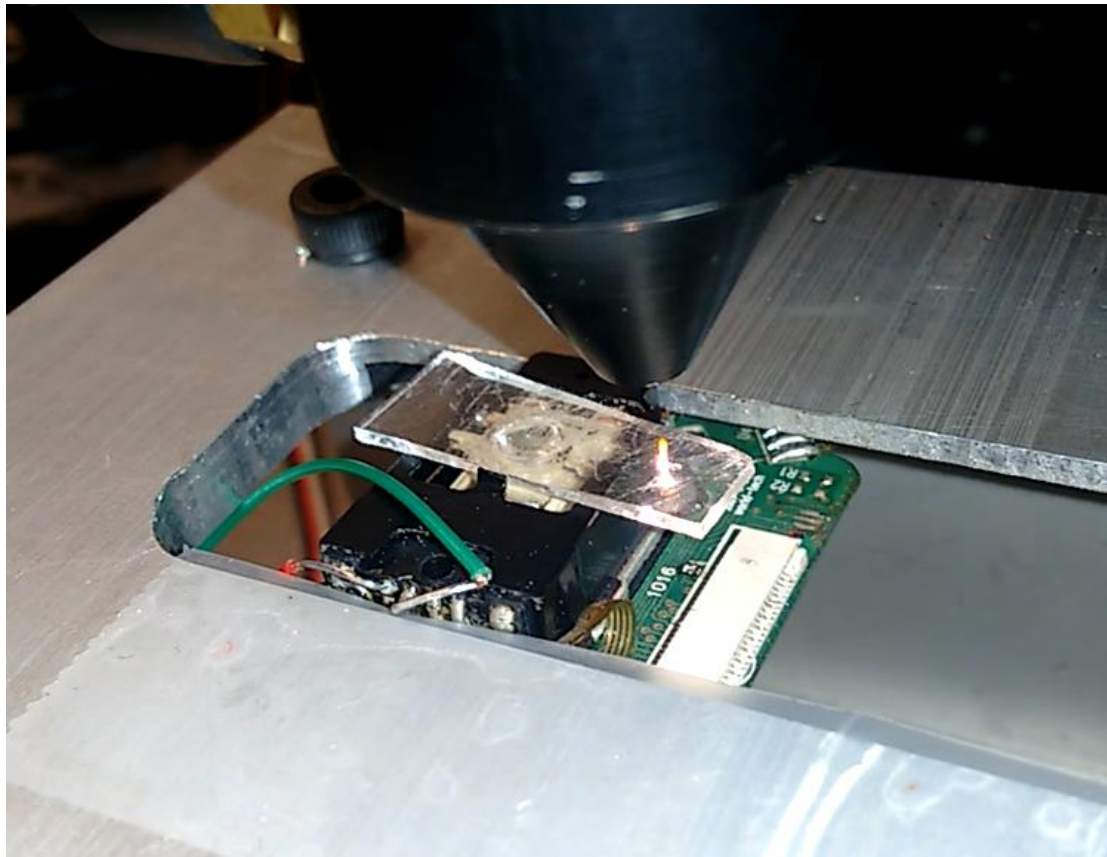


$$DC = 0.0003P^2 + 0.105P + (192.37T^{-0.533} - 2.5)$$

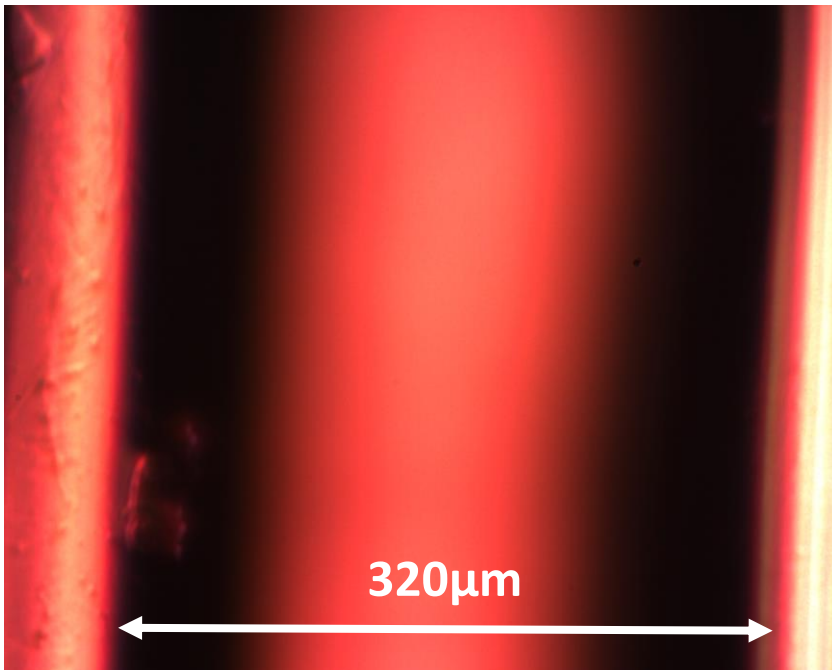
# Interfaz Gráfica de Usuario



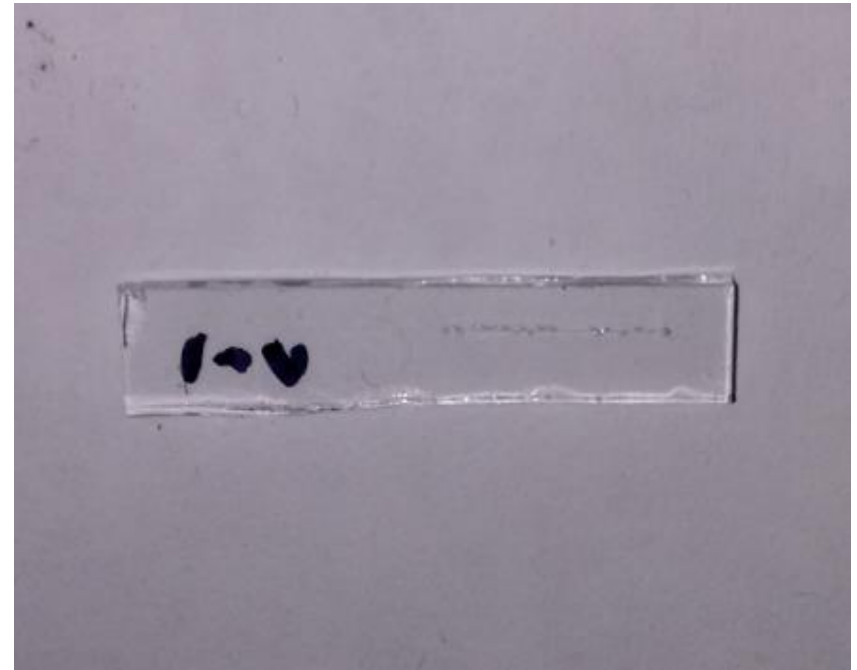
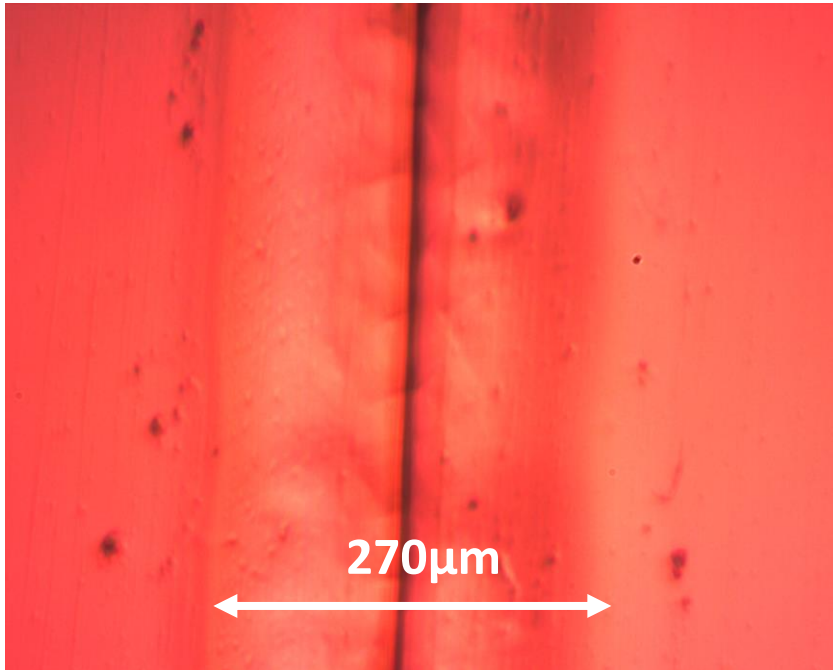
# Procesamiento láser



# Acrílico



# Vidrio





# Conclusiones

El sistema galvanométrico proporcionó un desplazamiento lineal de 2mm con una resolución de 255 pasos.

Para  $DP \approx 7.5W/mm^2$

Ancho de la guía en:

Polimetilmetacrilato  $\sim 320\mu m$

Vidrio  $\sim 270\mu m$

Los avances en este proyecto permitirá el prototipado rápido de guías de onda ópticas plana para la implementación de biosensores fotónicos integrados.



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