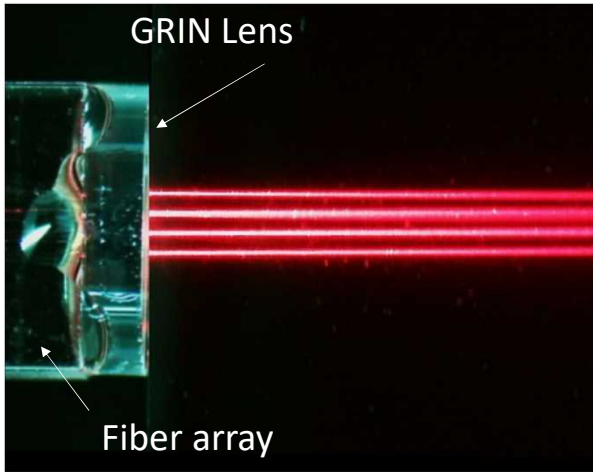
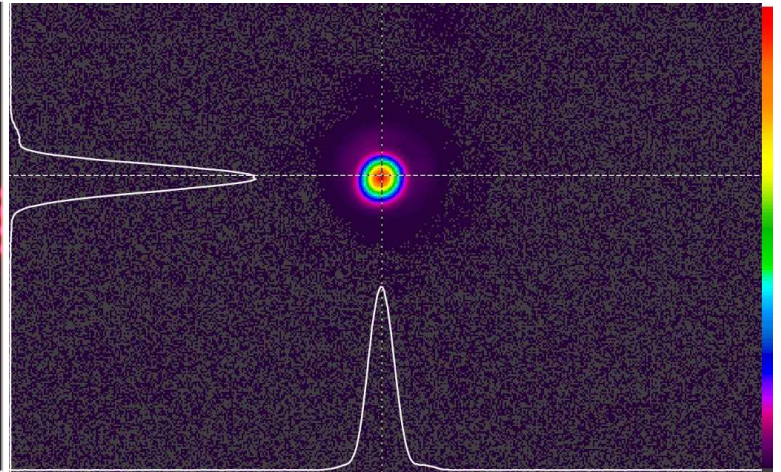


Integrated GRIN Lens (i-GRIN[®])

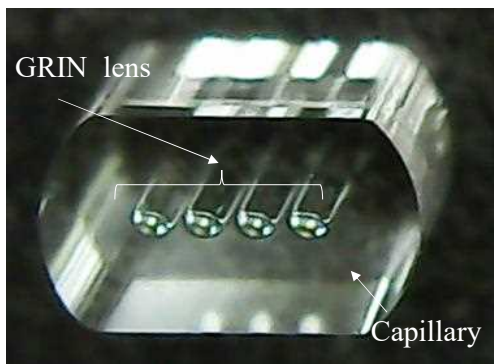
- ❑ Multi-channels - Number of GRIN lens : 1~24
- ❑ High precision - GRIN lens spacing accuracy < +/- 1 μ m



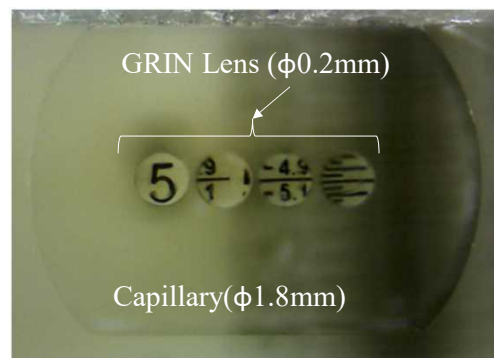
4ch-Collimated Beams



Beam profile of $\phi 125\mu\text{m}$ GRIN lens measured with Laser beam profiler (Ophir-Spiricon)



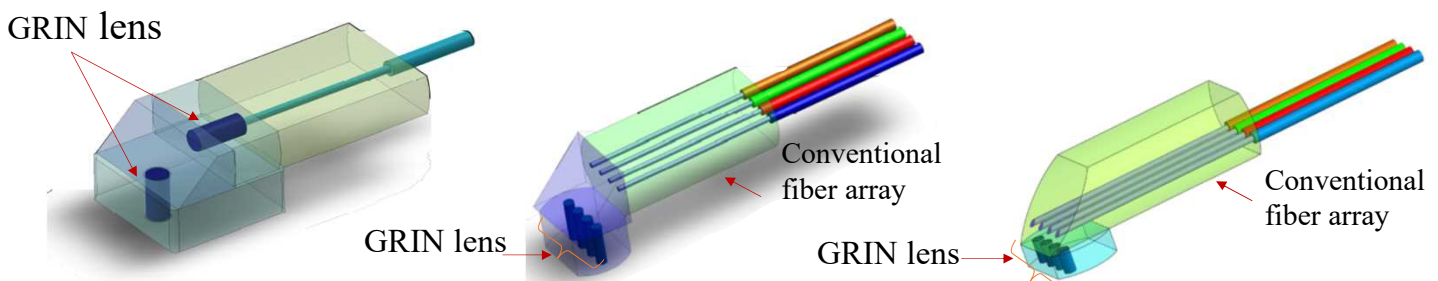
Four GRIN lenses in a capillary



End face of four GRIN lenses in a capillary

■ APPLICATIONS— Low Profile Coupler for SiPh

- Collimator type
- Focuser type with prism
- Focuser type without prism



Device height : 1~3 mm, Device width : 2~4 mm

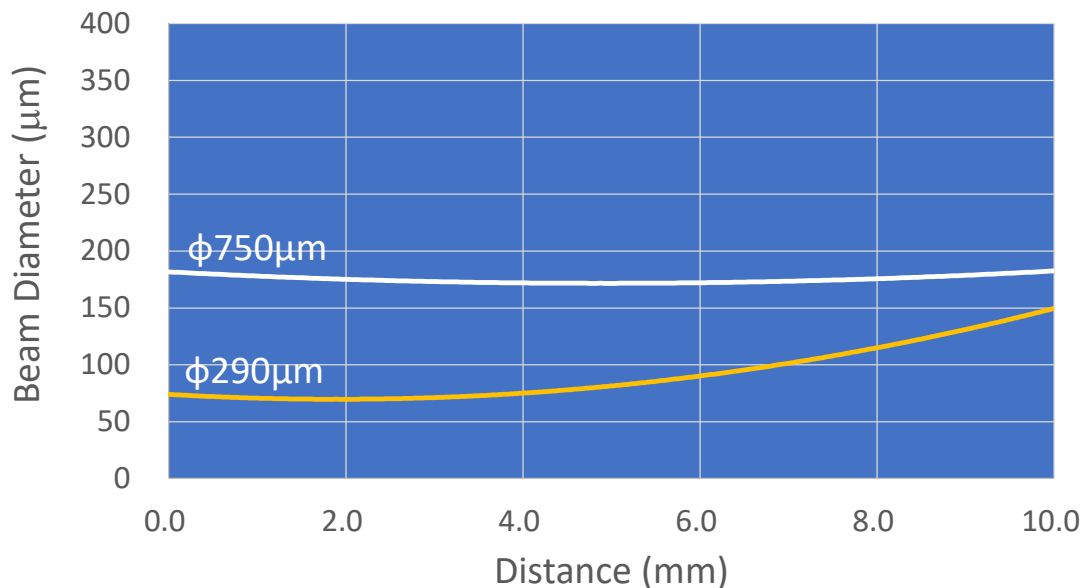
Nakahara Opto-Electronics Labs., Inc.
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NOEL

■ i-GRIN LENS PERFORMANCE

Diameter	Pitch Length (mm)	Gradient Constant (mm ⁻¹)	Beam Waist Position (mm)	Beam Diameter (μm)
125 μm	2.25	2.79	0.7	20
290 μm	5.18	1.21	3.2	61
350 μm	6.33	0.99	4.2	77
500 μm	9.05	0.69	5.0	120
750 μm	13.57	0.46	5.8	163


NA=0.2



Beam collimation & divergence of GRIN Lens (φ290 μm and φ750 μm)

■ OTHER APPLICATIONS

- Communication devices – Edge coupling for SiPh, MCF connector
- Medical devices – End-microscope, Optical Coherence Tomography
- Automobile devices & Robots – LiDAR, 3D imaging

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