# Miniature Spectrometers

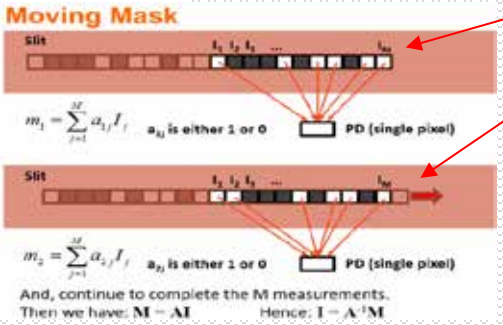
LUX PHOTONICS CONSORTIUM SINGAPORE

## Technology Overview

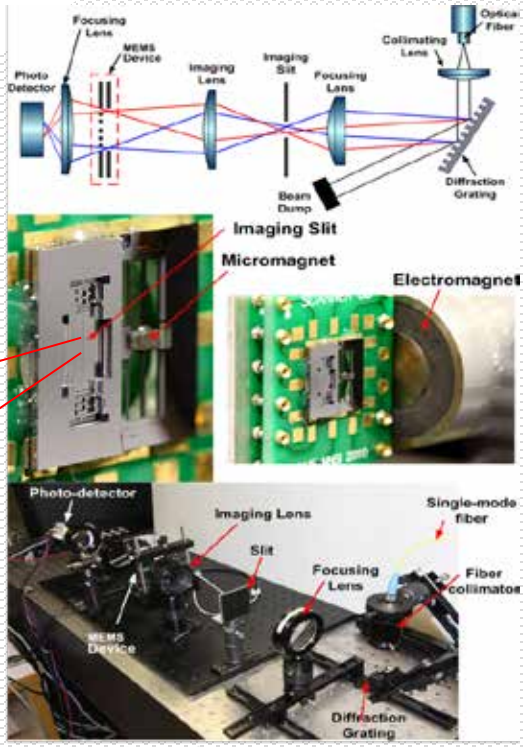
- § A portable spectrometer using a single-element detector, capable of operation at IR spectrum with low-cost
- § Multiplexing advantage enables potentially high SNR in detection
- § Less sensitive to positioning errors and external disturbances compare with FTIR
- § Miniaturised and still maintain a good spectral resolution

## Technology Features

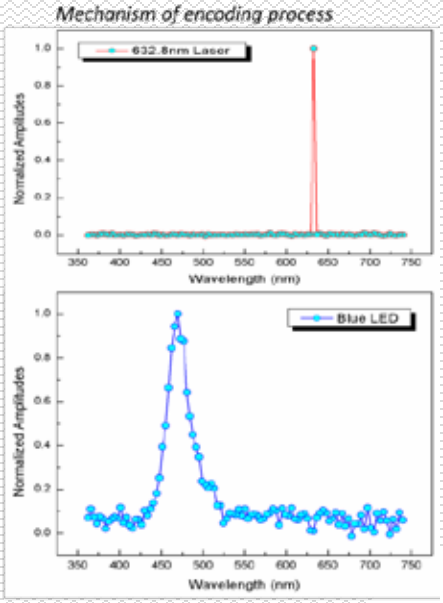
- § Contains dispersive optics and compact image encoding mechanism
- § A moving mask is placed after the imaging slit to encode incoming light to achieve multiplexing advantage
- § Uses a single-element photodetector, cost-effective for UV and/or IR wavelengths




*Mechanism of encoding process*




*Experimental setup*




*Experimental results for laser and LED*

## Potential Applications

- § Chemical detection and analysis
- § Industrial process control
- § Materials identification and verification
- § Biomedical point of care testing
- § Food and beverage quality assessment
- § Pharmaceutical research and drug development

## Benefits

- § Facilitate on-site detection and analysis of materials in real-time
- § Low cost, compact, light weight
- § Stand-alone handheld or portable spectrometer modules, in combination with smart phones

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