

## **Polarization Independent Birefringence Tunable (BGN)**

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**T**unable optical filters usually exhibit polarization dependence, which decreases the light throughput and necessitates the use of additional components that complicate the system. We have designed novel broadband, polarization-insensitive birefringent tunable filter arrangements that allow high throughput. The filters are based on a combination of tunable birefringent layers or polarization-dependent filters in combination with one or more of the following components: (i) thin film achromatic quarter waveplates based on the form birefringence of dielectric subwavelength grating structures, (ii) nano-photon metal structures; (iii) omnidirectional dielectric mirrors, (iv) polarization conversion mirrors, and/or (v) reflective polarized beam splitters for circularly polarized light. All these components may be implemented in thin film form on one or more substrates, such that a particularly compact and cost-effective filter can be produced. The birefringent layers may comprise any birefringent or magneto-optic layer, with liquid crystals being particularly suitable. High throughput is achieved by the use of novel polarization conversion disposition of the filter's components.

### **Goals and Benefits**

- Polarization independence
- High light throughput
- Broadband operation
- Compact design
- Fast tuning down to sub-ms

### **Potential Commercial Uses and Market**

- Hyper spectral imaging.
- Microscopy.
- Optical communication. emergency services

### **Development Stage and Development Status Summary**

- Design completed
- Prototype under construction


### **Research Team**

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### **Patent Status**

Patent Pending

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