

# All-Optical Dispersion Compensation

Researchers at Aston University have devised a range of innovative techniques for the all-optical management of dispersion and dispersion slope in optical fibres. Aston's Business Partnership Unit is now actively seeking partners to commercialize this portfolio of highly useful technologies.

## Background

Dispersion is a significant problem for optical transmission systems. As pulses of light travel down an optical fibre, they broaden due to chromatic dispersion. Moreover, due to dispersion slope, the dispersion experienced by each channel can vary. Dispersion therefore limits both data transmission rates and the length of the fibre through which an optical signal can be transmitted and successfully decoded by the receiver. These constraints are becoming increasingly problematic with the growth of data heavy applications such as streaming media over the Internet.

## The Inventions

### *Optical Pulse Transmission Lines*

This invention enables simultaneous compensation of dispersion and dispersion slope in WDM transmission systems. By deploying this invention, each optical channel in a WDM system will experience the same degree of dispersion. Additionally, dispersion management is achieved via existing standard optical fibres, rather than by deploying expensive fibres with built-in dispersion and dispersion slope characteristics.

### *Gires Tournois Etalons and Dispersion Compensation*

This invention uses thermally tuneable Gires Tournois etalons fabricated from pairs of fibre Bragg gratings to induce negative or positive dispersion on an optical pulse. This technique is fully compatible with optical fibre based systems, while displaying low insertion loss. A device based around this technique will be highly compact, highly manufacturable, and inexpensive. Significantly, this technique can be used to compensate a single optical channel or multiple channels simultaneously, while simultaneously compensating both dispersion and dispersion slope.

### *Dynamic Gires Tournois Etalons*

This invention offers improvements to the above mentioned GTE and Dispersion Compensation patent. The technique primarily uses an acoustic signal to generate and tune the GTE. These improvements allow for easier fabrication of GTEs, and extended dispersion tuning range and useful bandwidth. Moreover, the design allows reconfigurability of the system to accommodate for changes in bit rate or wavelength.

## Intellectual Property Protection

This portfolio comprises three granted US patents:

<i>Title</i>	<i>Patents Granted</i>	<i>Priority Claimed</i>	<i>Our Ref</i>
Optical Pulse Transmission Lines	US 6,826,340	May 29, 2001	PAT-2004-048
Gires Tournois Etalons and Dispersion Compensation	US 7,263,257	May 13, 2002	PAT-2004-055
Dynamic Gires Tournois Etalons	US 7,580,184	January 5, 2005	PAT-2004-104

## Further Information

Further information can be made available and commercial discussions commenced on entering into a non-disclosure agreement.

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