# Nanyang Technological University

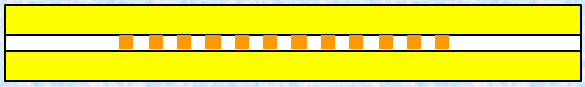
## Network Technology Research Centre

# Fibre Grating Synthesis

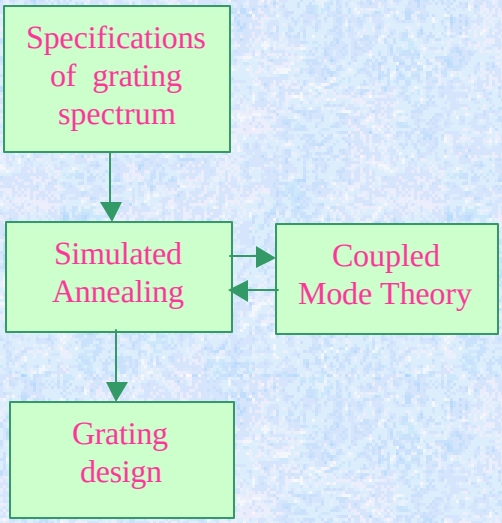
### Area of technology

Optical Communication and Networking

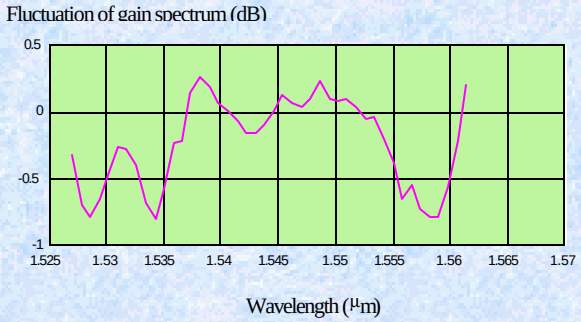
Fiber gratings are currently showing considerable potential as passive components in optical fiber communication system. Fiber grating based optical components have many advantages, such as all-fiber geometry, low insert loss, high return loss, low cost, and the flexibility for achieving desired spectral characteristics. Many methods are used for analyzing these structures and solving the functions of fiber gratings. However, we often need a particular transmission spectrum for a particular application, such as gain flattening of EDFA. Simulated annealing technique and coupled mode theory are combined to design optical fiber grating based components. In the design of the gain flattening filter, a series of Long Period Gratings (LPG) have to be chained together. Our method is convenient and effective for such designs.



Grating: the fluctuation of index change in the core.




Cascaded phase-shifted Long Period Grating and uniform LPG are designed to flatten the EDFA gain spectrum. In the range of 1527nm - 1560nm, the fluctuation of the flattened gain spectrum is 0.93dB. The result is shown below.




### Applications:

- Fiber grating based wavelength selective optical attenuators/reflector design
- The cascaded grating designs for optical amplifier gain flattening
- Chirped grating design for dispersion compensation


Investigators: **Assistant Prof. Shum Ping, Assoc. Prof. Lu Chao, Assoc. Prof. Cheng Tee Hiang, Assoc. Prof. Rao M. K., Ms Zhang Jing**

**Phone: 7904217, Email: epshum@ntu.edu.sg**