**What we claim is:**

1. An apparatus comprising:

one or more optical de-interleavers, each optical de-interleaver comprising:

an optical component having a first pair of optical input and output ports and a second pair of optical input and output ports; and

a 1x2 optical coupler, each optical output port of the optical component being optically connected to a corresponding optical port of the 1x2 optical coupler; and

wherein the optical component is constructed to operate as a first optical filter for light propagating between the optical ports of the first pair and is constructed to operate as a second optical filter for light propagating between the optical ports of the second pair, the first and second optical filters having substantially regularly spaced and interleaved passbands.

2. The apparatus of claim 1, wherein the optical component includes an AWG optical MUX capable of transmitting light from two optical ports thereof to an array of ends of optical waveguides end-coupled to an optical star coupler of the AWG optical MUX.

3. The apparatus of claim 2, wherein the optical component includes another AWG optical MUX capable of transmitting light from other ends of the optical waveguides of the array to two optical ports of the another AWG optical MUX.

4. The apparatus of claim 2, wherein the AWG optical MUX includes another optical star coupler and an AWG connecting the two optical star couplers, the array of ends of the optical waveguides being located on the surface to receive light from less than or equal to about half of the frequency band corresponding to one diffraction order of the AWG.

5. The apparatus of claim 1, further comprising an optical cross connect or an optical add drop multiplexer including the one or more optical de-interleavers, the one or more optical de-interleavers including two optical de-interleavers.

6. A method comprising:

transmitting a first light signal to an optical input of a first optical filter;

transmitting a second light signal to an optical input of a second optical filter; and

combining the light signals output by the first and second filters in response to the transmission of the first and second light signals thereto; and

wherein the first optical filter substantially blocks light in even-indexed spectral windows of a sequence of consecutively indexed adjacent spectral windows and transmits light odd-indexed windows of the sequence and the second optical filter substantially blocks light in the odd-indexed spectral windows of the sequence and transmits light in the even-indexed windows of the sequence.

7. The method of claim 6, wherein the first light signal has a nonzero intensity in some of the odd-indexed spectral windows of the sequence and the second light signal has a nonzero intensity in ones of the even-indexed spectral windows interleaved with the some of the odd-indexed spectral windows.

8. The method of claim 6, wherein the first and second transmitting steps include transmitting the light signals through a same serially concatenated pair of AWG optical MUXs.

9. A method, comprising:

intensity splitting a received light beam into first and second light beams with an optical intensity splitter;

filtering the first light beam to remove light in a set of even-indexed spectral windows of a sequence therefrom and to pass light in some of odd-indexed spectral windows of the sequence; and

filtering the second light beam to remove light in the odd-indexed spectral windows of the sequence therefrom and to pass light in some of the even-indexed spectral windows of the sequence; and

wherein the even-indexed and odd-indexed spectral windows form a sequence of consecutively-indexed adjacent spectral windows and the some of the even-indexed spectral windows are interleaved with the some of the odd-indexed spectral windows.

10. The method of claim 9, wherein the filtering steps include transmitting the first and second light beams to a same serially concatenated pair of AWG optical MUXs.

**What we claim is:**

1. An apparatus comprising:
one or more optical de-interleavers, each optical de-interleaver comprising:
an optical component having a first pair of optical input and output ports and a second pair of optical input and output ports; and
a 1×2 optical coupler, each optical output port of the optical component being optically connected to a corresponding optical port of the 1×2 optical coupler; and
wherein the optical component is constructed to operate as a first optical filter for light propagating between the optical ports of the first pair and is constructed to operate as a second optical filter for light propagating between the optical ports of the second pair, the first and second optical filters having substantially regularly spaced and interleaved passbands.

2. The apparatus of claim 1, wherein the 1×2 optical coupler is capable of operating as an optical intensity splitter.

3. The apparatus of claim 1, wherein the optical component includes an AWG optical MUX capable of transmitting light from two optical ports thereof to an array of ends of optical waveguides end-coupled to an optical star coupler of the AWG optical MUX.

4. The apparatus of claim 3, wherein the optical component includes another AWG optical MUX capable of transmitting light from other ends of the optical waveguides of the array to two optical ports of the another AWG optical MUX.

5. The apparatus of claim 3, wherein the AWG optical MUX includes another optical star coupler and an AWG connecting the two optical star couplers, the array of ends of the optical waveguides being located on the surface to receive light from less than or equal to about half of the frequency band corresponding to one diffraction order of the AWG.

6. The apparatus of claim 3, wherein the AWG optical MUX includes another optical star coupler and an AWG connecting the two optical star couplers, the array of ends subtending a maximal angle with respect to ends of optical waveguides of the AWG, the maximal radian angle being less than or equal to about 1.55 micrometers divided by twice an average center-to-center spacing of the ends of the optical waveguides of the AWG in micrometers and divided by the effective refractive index of the waveguides of the AWG.

7. The apparatus of claim 1, further comprising an optical cross connect or an optical add drop multiplexer including the one or more optical de-interleavers, the one or more optical de-interleavers including two optical de-interleavers.

8. The apparatus of claim 7, comprising a multi-span optical fiber transmission line, the line comprising the optical cross connect or optical add drop multiplexer.

9. An apparatus comprising:

a first AWG optical MUX including an array of optical ports coupled to two optical ports;

a second AWG optical MUX including an array of optical ports coupled to two optical ports, the optical ports of the arrays of the first and second AWG optical MUXs being connected in a one-to-one manner; and

a 2×1 optical coupler having a first optical port connected to one of the two optical ports of the first AWG optical MUX and having a second optical port connected to the other of the two optical ports of the first AWG optical MUX.

10. The apparatus of claim 9, wherein the first and second AWG optical MUXs are connected such that passbands for light propagating between a first of the two optical ports of the second AWG optical MUX and a first of the two optical ports of the first AWG optical MUX interleave between passbands for light propagating between a second of the two optical ports of the second AWG optical MUX and a second of the two optical ports of the first AWG optical MUX.

11. The apparatus of claim 9, further comprising an optical cross connect or an optical add drop multiplexer including the first and second AWG optical MUXs and the 2×1 optical coupler.

12. The apparatus of claim 11, comprising a multi-span optical fiber transmission line, the multi-span optical transmission fiber line comprising the optical cross connect or optical add drop multiplexer.

13. A method comprising:

transmitting a first light signal to an optical input of a first optical filter;

transmitting a second light signal to an optical input of a second optical filter; and

combining the light signals output by the first and second filters in response to the transmission of the first and second light signals thereto; and

wherein the first optical filter substantially blocks light in even-indexed spectral windows of a sequence of consecutively indexed adjacent spectral windows and transmits light odd-indexed windows of the sequence and the second optical filter substantially blocks light in the odd-indexed spectral windows of the sequence and transmits light in the even-indexed windows of the sequence.

14. The method of claim 13, wherein the first light signal has a nonzero intensity in some of the odd-indexed spectral windows of the sequence and the second light signal has a nonzero intensity in ones of the even-indexed spectral windows interleaved with the some of the odd-indexed spectral windows.

15. The method of claim 13, wherein the spectral windows have substantially equal widths.

16. The method of claim 13, wherein the first and second transmitting steps include transmitting the light signals through a same serially concatenated pair of AWG optical MUXs.

17. A method, comprising:

intensity splitting a received light beam into first and second light beams with an optical intensity splitter;

filtering the first light beam to remove light in a set of even-indexed spectral windows of a sequence therefrom and to pass light in some of odd-indexed spectral windows of the sequence; and

filtering the second light beam to remove light in the odd-indexed spectral windows of the sequence therefrom and to pass light in some of the even-indexed spectral windows of the sequence; and

wherein the even-indexed and odd-indexed spectral windows form a sequence of consecutively-indexed adjacent spectral windows and the some of the even-indexed spectral windows are interleaved with the some of the odd-indexed spectral windows.

18. The method of claim 17, wherein different ones of the spectral windows have about the same frequency-width.

19. The method of claim 17, wherein the filtering steps include transmitting the first and second light beams to a same serially concatenated pair of AWG optical MUXs.