## CLAIM

1. An apparatus, comprising:

a digital data transmitter capable of exciting a sequence of sets of one or more propagation modes in a physical communication channel, the sequence including different ones of the sets of one or more propagation modes having a different spatial distributions of transmitted energy in the physical communication channel; and

wherein the digital data transmitter is configured to change the excited set of one or more propagation modes to transmit a different value of data to the communication channel such that an identity of the excited set of one or more propagation modes fixes the value being transmitted in a corresponding temporal symbol interval.

2. The apparatus of claim 1, wherein the digital data transmitter is a wireless transmitter having an array of antennas and is able to power the antennas differently to sequentially excite different ones of the propagation modes or

wherein the digital data transmitter is an optical transmitter having an optical modulator that is capable of sequentially exciting different optical propagation modes in a multi-mode optical waveguide.

3. The apparatus of claim 1 or claim 2, wherein each set is a selected propagation mode, and the selected propagation modes of different ones of the sets are substantially orthogonal.

4. The apparatus of claim 1 or claim 2, wherein the digital data transmitter is configured to excite a different one of the propagation modes to transmit a different value of digital data.

5. An apparatus, comprising:

a digital data receiver being configured to measure a spatial energy distribution of one or more received electromagnetic signals in each temporal symbol period of a sequence and being configured to identify a set of one or more propagation modes excited in a physical communication channel by a transmitter from the spatial energy distribution measured for the corresponding temporal symbol period.

6. The apparatus of claim 5, wherein the digital data receiver includes an array of antennas for measuring the spatial energy distributions or includes an optical detector capable of identifying a propagation mode of an optical signal.

7. A method for point-to-point transmission of digital data, comprising:

receiving a sequence of digital data in a digital data transmitter;

for each received digital datum of the sequence, selecting a corresponding set of one or more propagation modes in the digital data transmitter such that different ones of the sets are selected for different values of the digital data;

with the digital data transmitter, successively exciting each selected set of one or more propagation modes in the physical communication channel during a corresponding temporal symbol period; and

wherein each set is configured to produce a different spatial energy pattern at a detector of a digital data receiver.

8. The method of claim 7, wherein each set is a different set of one or more optical transmission modes.

9. A method for point-to-point reception of data, comprising:

at each temporal symbol slot of a sequence thereof, measuring a spatial energy distribution of an electromagnetic signal received at a digital data receiver from a physical communication channel; and

from each measured spatial energy distribution, selecting a set of one or more propagation modes that likely excited the received spatial energy distribution in the corresponding temporal symbol slot.

10. The method of claim 9, wherein each act of measuring includes measuring a spatial energy intensity received from a free space communication channel or includes measuring a lateral spatial energy intensity received from a multi-mode optical waveguide.

11. The apparatus of claim 3, wherein the digital data transmitter is configured to excite a different one of the propagation modes to transmit a different value of digital data.

12. The apparatus of claim 8, the receiver being configured to identify a stream of transmitted digital data corresponding to the sequence of identified sets, different ones of the identified sets corresponding to different values of the transmitted digital data.

What is claimed is:

1. An apparatus, comprising:

a digital data transmitter capable of exciting a sequence of sets of one or more propagation modes in a physical communication channel, the sequence including different ones of the sets of one or more propagation modes having different spatial distributions of transmitted energy in the physical communication channel; and

wherein the digital data transmitter is configured to change the excited set of one or more propagation modes to transmit a different value of data to the communication channel such that an identity of the excited set of one or more propagation modes fixes the value being transmitted in a corresponding temporal symbol interval.

2. The apparatus of claim 1, wherein the digital data transmitter is a wireless transmitter having an array of antennas, and the transmitter is able to power the antennas differently to sequentially excite different ones of the propagation modes.

3. The apparatus of claim 1, wherein the digital data transmitter is an optical transmitter having an optical modulator that is capable of sequentially exciting different optical propagation modes in a multi-mode optical waveguide.

4. The apparatus of claim 1, wherein each set is a selected propagation mode, and the selected propagation modes of different ones of the sets are substantially orthogonal.

5. The apparatus of claim 1, wherein the digital data transmitter is configured to excite a different one of the propagation modes to transmit a different value of digital data.

6. The apparatus of claim 1, further comprising a digital data receiver connected to receive signals transmitted by the digital data transmitter and configured to identify the sets of one or more propagation modes excited by the digital data transmitter in the corresponding temporal symbol intervals.

7. The apparatus of claim 6, wherein the digital data receiver is a wireless receiver having an array of antennas, and the receiver is configured to measure intensities received by different ones of the antennas and to use said measured inten-

sities to identify the sets of one or more propagation modes excited in the corresponding temporal symbol intervals.

8. The apparatus of claim 6, wherein the digital data receiver is an optical receiver capable of identifying the sets of one or more propagation modes excited by the transmitter in a sequence of the corresponding temporal symbol intervals.

9. A method for point-to-point transmission of digital data, comprising:

receiving a sequence of digital data in a digital data transmitter;

for each received digital datum of the sequence, selecting a corresponding set of one or more propagation modes in the digital data transmitter such that different ones of the sets are selected for different values of the digital data;

with the digital data transmitter, successively exciting each selected set of one or more propagation modes in the physical communication channel during a corresponding temporal symbol period; and

wherein each set produces a different spatial energy pattern at a detector of a digital data receiver.

10. The method of claim 9, wherein each set is a different set of one or more optical transmission modes.

11. The method of claim 9, wherein each set includes a propagation mode that is orthogonal to a propagation mode of the remaining one or more sets.

12. The method of claim 9, wherein the selecting involves selecting a signal point from a constellation of fixed size, each set corresponding to one of the signal points.