CLAIMS

What is claimed is:

1. A data transmission method, wherein the method comprises:

generating downlink control information, DCI, wherein the DCI can indicate a first modulation scheme or a second modulation scheme, or can indicate only a second modulation scheme, and the DCI comprises a modulation and coding scheme, MCS, field, wherein the DCI indicates the first modulation scheme when the MCS field is in a first state, or the DCI indicates the second modulation scheme and an MCS index of the second modulation scheme when the MCS field is in a second state, wherein the first state is "1111", and the second state is a state other than 1111 and 1110 in "0000–1111"; and

sending the DCI.

2. The method according to claim 1, wherein the DCI further comprises a repetition field; and

the first modulation scheme is 16 quadrature amplitude modulation, QAM, and when the DCI indicates the 16QAM, the repetition field is converted into a field that indicates an MCS index of the 16QAM and that is in the DCI.

3. The method according to claim 1, wherein

when the DCI can indicate only the second modulation scheme, the DCI further comprises a repetition field, and the repetition field is N bits, wherein N is a positive integer;

when the DCI can indicate the first modulation scheme or the second modulation scheme, the DCI further comprises a field indicating an MCS index of the first modulation scheme, and the field indicating the MCS index of the first modulation scheme is K bits, wherein K is a positive integer and K is less than or equal to N; and the DCI does not comprise the repetition field, or the DCI further comprises the repetition field and the repetition field is less than or equal to N–K bits.

4. The method according to claim 3, wherein K is 3 bits, and/or N is 3 bits when the DCI schedules uplink transmission, or N is 4 bits when the DCI schedules downlink transmission.

5. The method according to claim 1, wherein the DCI is control information scrambled by using a PUR-RNTI, and the DCI further comprises an acknowledgment feedback or fallback indication field.

6. The method according to claim 5, wherein the DCI is the control information scrambled by using the PUR-RNTI, and when the DCI indicates the first modulation scheme, the DCI further comprises a field indicating an MCS index of the first modulation scheme, and the DCI does not comprise a repetition adjustment field.

7. The method according to any one of claims 1 to 6, wherein the MCS field is 4 bits.

8. The method according to any one of claims 1 and 3 to 7, wherein the first modulation

scheme is 16 quadrature amplitude modulation, QAM, and the second modulation scheme is quadrature phase shift keying, QPSK.

9. A data transmission method, wherein the method comprises:

receiving downlink control information, DCI, wherein the DCI can indicate a first modulation scheme or a second modulation scheme, or can indicate only a second modulation scheme, and the DCI comprises a modulation and coding scheme, MCS, field, wherein the DCI indicates the first modulation scheme when the MCS field is in a first state, or the DCI indicates the second modulation scheme and an MCS index of the second modulation scheme when the MCS field is in a second state, wherein the first state is "1111", and the second state is a state other than 1111 and 1110 in "0000–1111"; and

receiving or sending data based on the DCI.

10. The method according to claim 9, wherein the DCI further comprises a repetition field; and

the first modulation scheme is 16 quadrature amplitude modulation, QAM, and when the DCI indicates the 16QAM, the repetition field is converted into a field that indicates an MCS index of the 16QAM and that is in the DCI.

11. The method according to claim 9, wherein

when the DCI can indicate only the second modulation scheme, the DCI further comprises a repetition field, and the repetition field is N bits, wherein N is a positive integer;

when the DCI can indicate the first modulation scheme or the second modulation scheme, the DCI further comprises a field indicating an MCS index of the first modulation scheme, and the field indicating the MCS index of the first modulation scheme is K bits, wherein K is a positive integer and K is less than or equal to N; and the DCI does not comprise the repetition field, or the DCI further comprises the repetition field and the repetition field is less than or equal to N–K bits.

12. The method according to claim 11, wherein K is 3 bits, and/or N is 3 bits when the DCI schedules uplink transmission, or N is 4 bits when the DCI schedules downlink transmission.

13. The method according to claim 9, wherein the DCI is control information scrambled by using a PUR-RNTI, and the DCI further comprises an acknowledgment feedback or fallback indication field.

14. The method according to claim 13, wherein the DCI is the control information scrambled by using the PUR-RNTI, and when the DCI indicates the first modulation scheme, the DCI further comprises a field indicating an MCS index of the first modulation scheme, and the DCI does not comprise a repetition adjustment field.

15. The method according to any one of claims 9 to 14, wherein the MCS field is 4 bits.

16. The method according to any one of claims 9 and 11 to 15, wherein the first modulation

scheme is 16 quadrature amplitude modulation, QAM, and the second modulation scheme is quadrature phase shift keying, QPSK.

17. The method according to any one of claims 9 to 16, wherein the receiving or sending data based on the DCI comprises: receiving or sending the data based on the first modulation scheme and the MCS index of the first modulation scheme that are indicated by the DCI, or the second modulation scheme and the MCS index of the second modulation scheme that are indicated by the DCI.

18. A communication apparatus, wherein the apparatus comprises:

a processing unit, configured to generate downlink control information, DCI, wherein the DCI can indicate a first modulation scheme or a second modulation scheme, or can indicate only a second modulation scheme, and the DCI comprises a modulation and coding scheme, MCS, field, wherein the DCI indicates the first modulation scheme when the MCS field is in a first state, or the DCI indicates the second modulation scheme and an MCS index of the second modulation scheme when the MCS field is in a second state, wherein the first state is "1111", and the second state is a state other than 1111 and 1110 in "0000–1111"; and

a sending unit, configured to send the DCI.

19. The apparatus according to claim 18, wherein the DCI further comprises a repetition field; and

the first modulation scheme is 16 quadrature amplitude modulation QAM, and when the DCI indicates the 16QAM, the repetition field is converted into a field that indicates an MCS index of the 16QAM and that is in the DCI.

20. The apparatus according to claim 18, wherein

when the DCI can indicate only the second modulation scheme, the DCI further comprises a repetition field, the repetition field is N bits, wherein N is a positive integer;

when the DCI can indicate the first modulation scheme or the second modulation scheme, the DCI further comprises a field indicating an MCS index of the first modulation scheme, and the field indicating the MCS index of the first modulation scheme is K bits, wherein K is a positive integer and K is less than or equal to N; and the DCI does not comprise the repetition field, or the DCI further comprises the repetition field and the repetition field is less than or equal to N–K bits.

21. The apparatus according to claim 20, wherein K is 3 bits, and/or N is 3 bits when the DCI schedules uplink transmission, or N is 4 bits when the DCI schedules downlink transmission.

22. The apparatus according to claim 18, wherein the DCI is control information scrambled by using a PUR-RNTI, and the DCI further comprises an acknowledgment feedback or fallback indication field.

23. The apparatus according to claim 22, wherein the DCI is the control information

scrambled by using the PUR-RNTI, and when the DCI indicates the first modulation scheme, the DCI further comprises a field indicating an MCS index of the first modulation scheme, and the DCI does not comprise a repetition adjustment field.

24. The apparatus according to any one of claims 18 to 23, wherein the MCS field is 4 bits.

25. The apparatus according to any one of claims 18 and 20 to 24, wherein the first modulation scheme is 16 quadrature amplitude modulation, QAM, and the second modulation scheme is quadrature phase shift keying, QPSK.

26. A communication apparatus, wherein the apparatus comprises:

a processing unit, configured to receive downlink control information, DCI, wherein the DCI can indicate a first modulation scheme or a second modulation scheme, or can indicate only a second modulation scheme, and the DCI comprises a modulation and coding scheme, MCS, field, wherein the DCI indicates the first modulation scheme when the MCS field is in a first state, or the DCI indicates the second modulation scheme and an MCS index of the second modulation scheme when the MCS field is in a second state, wherein the first state is "1111", and the second state is a state other than 1111 and 1110 in "0000–1111"; and

a transceiver unit, configured to receive or send data based on the DCI.

27. The apparatus according to claim 26, wherein the DCI further comprises a repetition field; and

the first modulation scheme is 16 quadrature amplitude modulation QAM, and when the DCI indicates the 16QAM, the repetition field is converted into a field that indicates an MCS index of the 16QAM and that is in the DCI.

28. The apparatus according to claim 27, wherein

when the DCI can indicate only the second modulation scheme, the DCI further comprises a repetition field, and the repetition field is N bits, wherein N is a positive integer;

when the DCI can indicate the first modulation scheme or the second modulation scheme, the DCI further comprises a field indicating an MCS index of the first modulation scheme, and the field indicating the MCS index of the first modulation scheme is K bits, wherein K is a positive integer and K is less than or equal to N; and the DCI does not comprise the repetition field, or the DCI further comprises the repetition field and the repetition field is less than or equal to N–K bits.

29. The apparatus according to claim 28, wherein K is 3 bits, and/or N is 3 bits when the DCI schedules uplink transmission, or N is 4 bits when the DCI schedules downlink transmission.

30. The apparatus according to claim 26, wherein the DCI is control information scrambled by using a PUR-RNTI, and the DCI further comprises an acknowledgment feedback or fallback indication field.

31. The apparatus according to claim 30, wherein the DCI is the control information

scrambled by using the PUR-RNTI, and when the DCI indicates the first modulation scheme, the DCI further comprises a field indicating an MCS index of the first modulation scheme, and the DCI does not comprise a repetition adjustment field.

32. The apparatus according to any one of claims 26 to 31, wherein the MCS field is 4 bits.

33. The apparatus according to any one of claims 26 and 28 to 32, wherein the first modulation scheme is 16 quadrature amplitude modulation, QAM, and the second modulation scheme is quadrature phase shift keying, QPSK.

34. The apparatus according to any one of claims 26 to 33, wherein the transceiver unit is specifically configured to receive or send the data based on the first modulation scheme and the MCS index of the first modulation scheme that are indicated by the DCI, or the second modulation scheme and the MCS index of the second modulation scheme that are indicated by the DCI.

35. The method according to claim 1, wherein when the MCS field is in a second state, the first modulation scheme is indicated by using a redundancy state in a subcarrier indication field in the DCI.

36. The method according to claim 35, wherein when a subcarrier spacing for the DCI is 15 kHz, the subcarrier indication field indicating a subcarrier index of 19 to 63 is reserved.

37. The method according to claim 9, wherein when the MCS field is in a second state, the first modulation scheme is indicated by using a redundancy state in a subcarrier indication field in the DCI.

38. The method according to claim 37, wherein when a subcarrier spacing for the DCI is 15 kHz, the subcarrier indication field indicating a subcarrier index of 19 to 63 is reserved.

39. A communication apparatus, wherein the apparatus comprises a processor and an interface circuit, wherein

the interface circuit is configured to exchange code instructions with the processor; and

the processor is configured to execute a computer program or instructions stored in at least one memory, to enable the apparatus to perform the method according to any one of claims 1 to 8, the method according to claim 35 or 36, the method according to any one of claims 9 to 17, or the method according to claim 37 or 38.

40. A readable storage medium, configured to store instructions, wherein when the instructions are executed, the method according to any one of claims 1 to 8, the method according to claim 35 or 36, the method according to any one of claims 9 to 17, or the method according to claim 37 or 38 is implemented.

41. A computer program product, wherein when a computer reads and executes the computer program product, the computer is enabled to perform the method according to any one of claims 1 to 8, the method according to claim 35 or 36, the method according to any one of claims 9 to 17,

or the method according to claim 37 or 38.