

WHAT IS CLAIMED IS:

1. A beam indication method, ~~applied to~~performed by a user equipment (UE) and characterized in comprising:

acquiring (101) first indication information, wherein the first indication information is configured to indicate a target unified beam; and

performing (102) at least ~~two~~first and second types of communication with a network device using the target unified beam, wherein the first type of communication comprises communication of a channel, and ~~or~~ the second type of communication comprises communication of a reference signal.

2. The beam indication method according to claim 1, wherein the first indication information comprises a target unified transmission configuration indicator (TCI) state index or ~~index~~a combination of target unified TCI state indexes.

3. The beam indication method according to claim 2, wherein the target unified TCI state index corresponds to a transmission and reception point (TRP) index or a coreset pool index.

4. The beam indication method according to claim 2, wherein the target unified TCI state index corresponds to one or more reference signals, and each of the one or more reference signals is configured to indicate at least one of an uplink target unified beam and a downlink target unified beam.

5. The beam indication method according to any one of claims 1 to 4, wherein acquiring (101) the first indication information comprises:

receiving (301) from the network device a control element signaling of a medium access control layer; (MAC CE signaling), wherein the MAC CE signaling carries second indication information for activating one or more TCI state indexes, and one TCI state index corresponds to one TRP index or one coreset pool index; and

determining (302) the first indication information according to the one or more TCI state indexes activated by the second indication information.

6. The beam indication method according to claim 5, wherein one TCI state index is activated by the second indication information for one TRP index or one coreset pool index, and wherein determining the first indication information according to the one or more TCI state indexes activated by the second indication information comprises:

determining the one TCI state index activated by the second indication information as the first indication information.

7. The beam indication method according to claim 5, wherein multiple TCI state indexes are activated by the second indication information for one TRP index or one coreset pool

index, and wherein determining the first indication information according to the one or more TCI state indexes activated by the second indication information comprises:

receiving a first downlink control information (DCI) signaling transmitted by the network device, wherein the first DCI signaling carries the first indication information;

wherein the first indication information comprises one target unified TCI state index or index combination among the multiple TCI state indexes activated by the second indication information.

8. The beam indication method according to claim 7, further comprising:

transmitting (402) first hybrid automatic repeat request (HARQ) feedback information to the network device;

wherein the first HARQ feedback information is configured to indicate to the network device whether the first DCI signaling is successfully received; and an HARQ feedback resource used for transmitting the first HARQ feedback information is configured by the first DCI signaling, or is default.

9. The beam indication method according to claim 8, wherein performing at least ~~two~~ first and second types of communication with the network device using the target unified beam comprises:

receiving (403), using the target unified beam on a physical downlink control channel (PDCCH), a second DCI signaling transmitted by the network device;

wherein the second DCI signaling carries resource configuration information for configuring a communication resource for a reference signal, a physical random access channel (PRACH), a physical uplink shared channel (PUSCH), a physical uplink control channel (PUCCH) and/or a physical downlink shared channel (PDSCH).

10. The beam indication method according to any one of claims 7 to 9, wherein the first DCI signaling further carries resource configuration information for configuring a communication resource for at least one of a reference signal, a PRACH, a PUSCH, a PUCCH or a PDSCH.

11. The beam indication method according to claim 10, further comprising: transmitting (502) second HARQ feedback information to the network device;

wherein the second HARQ feedback information comprises:

first feedback information, configured to feed back whether the first DCI signaling is successfully received; and/or

second feedback information, configured to feed back whether the PDSCH and/or a downlink reference signal configured by the first DCI signaling is successfully received.

~~12. The beam indication method according to claim 11, wherein HARQ feedback resources used for transmitting the first feedback information and/or the second feedback information are configured by the first DCI signaling or are default.~~

~~13. The beam indication method according to claim 12, wherein the HARQ feedback resources used for transmitting the first feedback information and/or the second feedback information are the same HARQ feedback resources or different HARQ feedback resources.~~

~~14. The beam indication method according to claim 13, wherein the first feedback information and/or the second feedback information correspond to the same or different bits in the same HARQ feedback resource.~~

~~15. The beam indication method according to claim 8, wherein a transmitting beam for transmitting the first HARQ feedback information is a transmitting beam corresponding to a target unified beam corresponding to the target unified TCI state index or index combination in the first DCI signaling, or a transmitting beam corresponding to a receiving beam for receiving the first DCI signaling.~~

~~16. The beam indication method according to claim 11, wherein a transmitting beam for transmitting the second HARQ feedback information is a transmitting beam corresponding to a target unified beam corresponding to the target unified TCI state index or index combination in the first DCI signaling, or a transmitting beam corresponding to a receiving beam for receiving the first DCI signaling.~~

~~17~~12. The beam indication method according to claim 10, further comprising:

performing the communication with the network device using the communication resource configured according to the resource configuration information carried in the first DCI signaling.

~~18. The beam indication method according to claim 17, wherein in a case where a time interval between the communication and the first DCI signaling is less than a threshold, the communication adopts a same beam as the first DCI signaling; and~~

~~in a case where the time interval between the communication and the first DCI signaling is greater than or equal to the threshold, the communication adopts a target unified beam corresponding to the target unified TCI state index or index combination in the first DCI signaling.~~

~~19. The beam indication method according to claim 18, wherein the threshold is notified by the network device;~~

~~wherein the method further comprises transmitting a reference time to the network device, wherein the reference time is configured to be used by the network device to~~

determine the threshold;

wherein the reference time comprises a time for decoding the first DCI signaling, a time for an HARQ feedback corresponding to the first DCI signaling, and a time for beam switch;

or

the reference time comprises the time for the HARQ feedback corresponding to the first DCI signaling and the time for the beam switch.

20. The beam indication method according to claim 18, wherein the threshold is default to be set in the UE.

21. The beam indication method according to claim 7, wherein the UE uses one or more receiving beams to receive one or more transmissions of the first DCI signaling.

22. The beam indication method according to claim 7, wherein the first DCI signaling is a DCI signaling for downlink resource scheduling, a DCI signaling for uplink resource scheduling, or a DCI signaling for uplink and downlink resource scheduling, or a DCI signaling only for uplink and downlink target unified beam indication.

23. The beam indication method according to claim 2, wherein the target unified TCI state index comprises at least one of a downlink target unified TCI state index, an uplink target unified TCI state index, or an uplink and downlink target unified TCI state index.

24. The beam indication method according to any one of claims 1-23, further comprising:

receiving third indication information transmitted by the network device, wherein the third indication information is configured to indicate the UE to adopt the target unified beam or a dedicated beam to perform the at least two types of communication.

25. The beam indication method according to any one of claims 1-24, wherein the first indication information further comprises indication information of the at least two types of communication.

26. The beam indication method according to any one of claims 1-25, wherein the channel comprises at least one of or any combination of the following channels:

a physical downlink control channel, PDCCH;

a physical downlink shared channel, PDSCH;

a physical uplink control channel, PUCCH;

a physical uplink shared channel, PUSCH;

a physical broadcast channel, PBCH; or

a physical random access channel, PRACH.

27. The beam indication method according to any one of claims 1-26, wherein the

reference signal comprises at least one of or any combination of the following signals:

a channel state information reference signal, CSI-RS;

a synchronization signal and PBCH block, SSB;

a demodulation reference signal, DMRS;

a positioning reference signal, PRS;

a tracking reference signal, TRS; or

a sounding reference signal, SRS.

~~2813.~~ A beam indication method, ~~applied to~~performed by a network device and characterized in comprising:

transmitting ~~(601)~~ first indication information to a user equipment (UE),

wherein the first indication information is configured to indicate a target unified beam to enable the UE to perform at least ~~first and second~~two types of communication with the network device using the target unified beam, and wherein the first type of communication comprises communication of a channel, and ~~or~~ the second type of communication comprises communication of a reference signal.

~~2914.~~ The beam indication method according to claim ~~2813~~, wherein the first indication information comprises a target unified transmission configuration indicator (TCI) state index or ~~index~~ a combination of target unified TCI state indexes.

~~3015.~~ The beam indication method according to claim ~~2914~~, wherein the target unified (TCI) state index corresponds to a transmission and reception point (TRP) index or a coreset pool index.

~~3116.~~ The beam indication method according to claim ~~2914~~, wherein the target unified TCI state index corresponds to one or more reference signals, and each of the one or more reference signals is configured to indicate at least one of an uplink target unified beam and a downlink target unified beam.

~~3217.~~ The beam indication method according to any one of claims 2813 to 16, wherein transmitting ~~(601)~~ the first indication information to the user equipment (UE) comprises:

transmitting ~~(801)~~ to the UE a control element signaling of a medium access control layer, (MAC CE signaling), wherein the MAC CE signaling carries second indication information for activating one or more TCI state indexes, and one TCI state index corresponds to one TRP index or one coreset pool index; ~~and~~

wherein the one or more TCI state indexes activated by the second indication information are configured to determine the first indication information.

~~3318.~~ The beam indication method according to claim ~~3217~~, wherein one TCI state

index is activated by the second indication information for one TRP index or one coreset pool index; and

wherein the first indication information represents the one TCI state index activated by the second indication information.

~~3419.~~ The beam indication method according to claim ~~3217~~, wherein multiple TCI state indexes are activated by the second indication information for one TRP index or one coreset pool index, and

wherein transmitting the first indication information to the user equipment (UE) further comprises:

transmitting a first downlink control information DCI signaling to the UE, wherein the first DCI signaling carries the first indication information;

wherein the first indication information comprises one target unified TCI state index or index combination among the multiple TCI state indexes activated by the second indication information.

~~3520.~~ The beam indication method according to claim ~~3219~~, further comprising:

receiving (902) first hybrid automatic repeat request (HARQ) feedback information transmitted by the UE;

wherein the first HARQ feedback information is configured to indicate to the network device whether the first DCI signaling is successfully received; and an HARQ feedback resource used for transmitting the first HARQ feedback information is configured by the first DCI signaling, or is default.

~~3621.~~ The beam indication method according to claim ~~3520~~, further comprising:

transmitting (903) a second DCI signaling to the UE on a physical downlink control channel (PDCCH), so that the UE receives the second DCI signaling using the target unified beam;

wherein the second DCI signaling carries resource configuration information for configuring a communication resource for a reference signal, a physical random access channel (PRACH), a physical uplink shared channel (PUSCH), a physical uplink control channel (PUCCH) and/or a physical downlink shared channel (PDSCH).

~~37. The beam indication method according to claim 35, wherein the first DCI signaling further carries resource configuration information for configuring a communication resource for at least one of a reference signal, a PRACH, a PUSCH, a PUCCH or a PDSCH.~~

~~38. The beam indication method according to claim 37, further comprising: receiving second HARQ feedback information transmitted by the UE;~~

wherein the second HARQ feedback information comprises:

first feedback information, configured to feed back whether the first DCI signaling is successfully received; and/or

second feedback information, configured to feed back whether the PDSCH and/or a downlink reference signal configured by the first DCI signaling is successfully received.

39. The beam indication method according to claim 38, wherein HARQ feedback resources used for transmitting the first feedback information and/or the second feedback information are configured by the first DCI signaling or are default.

40. The beam indication method according to claim 39, wherein the HARQ feedback resources used for transmitting the first feedback information and/or the second feedback information are the same HARQ feedback resources or different HARQ feedback resources.

41. The beam indication method according to claim 40, wherein the first feedback information and/or the second feedback information correspond to the same or different bits in the same HARQ feedback resource.

42. The beam indication method according to claim 35, wherein a transmitting beam for transmitting the first HARQ feedback information is a transmitting beam corresponding to a target unified beam corresponding to the target unified TCI state index or index combination in the first DCI signaling, or a transmitting beam corresponding to a receiving beam for receiving the first DCI signaling.

43. The beam indication method according to claim 38, wherein a transmitting beam for transmitting the second HARQ feedback information is a transmitting beam corresponding to a target unified beam corresponding to the target unified TCI state index or index combination in the first DCI signaling, or a transmitting beam corresponding to a receiving beam for receiving the first DCI signaling.

44. The beam indication method according to claim 37, further comprising:

performing the communication with the UE according to the resource configuration information carried in the first DCI signaling.

45. The beam indication method according to claim 42, wherein an indication that a time interval between the communication and the first DCI signaling is less than a threshold represents an indication that the UE performs the communication using a same beam as the first DCI signaling; and

an indication that the time interval between the communication and the first DCI signaling is greater than or equal to the threshold represents an indication that the UE performs the communication using a target unified beam corresponding to the target unified

TCI state index or index combination in the first DCI signaling.

46. The beam indication method according to claim 45, further comprising: receiving a reference time transmitted by the UE, and transmitting indication information of the threshold to the UE;

wherein the reference time comprises a time for the UE to decode the first DCI signaling, a time for the UE to perform an HARQ feedback corresponding to the first DCI signaling, and a time for beam switch; or

the reference time comprises the time for the UE to perform the HARQ feedback corresponding to the first DCI signaling and the time for the beam switch.

47. The beam indication method according to claim 34, wherein the first DCI signaling is transmitted for one or more times, and the UE is indicated to receive the first DCI signaling using one or more receiving beams.

48. The beam indication method according to claim 34, wherein the first DCI signaling is a DCI signaling for downlink resource scheduling, a DCI signaling for uplink resource scheduling, a DCI signaling for uplink and downlink resource scheduling, or a DCI signaling only for uplink and downlink target unified beam indication.

49. The beam indication method according to claim 29, wherein the target unified TCI state index comprises at least one of a downlink target unified TCI state index, an uplink target unified TCI state index, or an uplink and downlink target unified TCI state index.

50. The beam indication method according to any one of claims 28-49, further comprising:

transmitting third indication information to the UE, wherein the third indication information is configured to indicate the UE to adopt the target unified beam or a dedicated beam to perform the at least two types of communication.

51. The beam indication method according to any one of claims 28-50, wherein the first indication information further comprises indication information of the at least two types of communication.

52. The beam indication method according to any one of claims 28-51, wherein the channel comprises at least one of or any combination of the following channels:

- a physical downlink control channel, PDCCH;
- a physical downlink shared channel, PDSCH;
- a physical uplink control channel, PUCCH;
- a physical uplink shared channel, PUSCH;
- a physical broadcast channel, PBCH; or
- a physical random access channel, PRACH.

~~53. The beam indication method according to any one of claims 28-52, wherein the reference signal comprises at least one of or any combination of the following signals:~~

~~a channel state information reference signal, CSI-RS;~~

~~a synchronization signal and PBCH block, SSB;~~

~~a demodulation reference signal, DMRS;~~

~~a positioning reference signal, PRS;~~

~~a tracking reference signal, TRS; or~~

~~a sounding reference signal, SRS.~~

5422. A beam indication apparatus, applied to a user equipment (UE) and comprising:

an acquiring module, configured to acquire first indication information, wherein the first indication information is configured to indicate a target unified beam; and

an executing module, configured to perform at least first and second~~two~~ types of communication with a network device using the target unified beam, wherein the first type of communication comprises communication of a channel, and/or the second type of communication comprises communication of a reference signal.

5523. A beam indication apparatus, applied to a network device and comprising:

an indication module, configured to transmit first indication information to a user equipment (UE),

wherein the first indication information is configured to indicate a target unified beam to enable the UE to perform at least first and second~~two~~ types of communication with the network device using the target unified beam, and wherein the first type of communication comprises communication of a channel, and/or the second type of communication comprises communication of a reference signal.

5624. A communication device, comprising:

a transceiver;

a memory (1400); and

a processor (1300), connected to the transceiver and the memory (1400), and configured to control wireless signal transmission and reception of the transceiver by executing computer-executable instructions stored in the memory, and implement the method according to any one of claims 1 to 27-12 or the method according to any one of claims 28-13 to 53-21.

5725. A computer storage medium having stored therein computer-executable instructions that, when executed by a processor (1300), cause the method according to any one of claims 1 to 27-12 or the method according to any one of claims 28-13 to 53-21 to be implemented.