What is claimed is:

1. A method for reporting channel status information (CSI), performed by a terminal, comprising:

transmitting an uplink reference signal to a network device;

receiving beamformed downlink pilot signals transmitted by the network device at T consecutive time points;

estimating downlink effective channel information corresponding to the T consecutive time points according to the beamformed downlink pilot signals of the T consecutive time points;

determining CSI corresponding to the T consecutive time points according to the downlink effective channel information corresponding to the T consecutive time points; and

reporting the CSI to the network device;

wherein, a beam used by the beamformed downlink pilot signals is determined based on uplink channel information estimated according to the uplink reference signal, and the CSI is used by the network device to determine a precoding matrix for downlink data transmission at a time point t, wherein the time point t is after the T consecutive time points, and T is a positive integer.

2. The method according to claim 1, wherein the CSI comprises at least one of:

port selection indication information;

frequency domain basis vector indication information;

time domain Doppler component indication information; or

combination coefficient indication information;

wherein, the port selection indication information is used to indicate L reference signal ports selected by the terminal, the frequency domain basis vector indication information is used to indicate M frequency domain basis vectors selected by the terminal, the time domain Doppler component indication information is used to indicate K time domain Doppler components selected by the terminal, and the combination coefficient indication information is used to indicate a combination coefficient determined by the terminal, wherein the parameter L, the parameter M and the parameter K are positive integers.

3. The method according to claim 2, wherein the parameter K is determined in at least one of following ways:

being configured by the network device;

being predefined through negotiation between the terminal device and the network device; or

being determined by the terminal according to the downlink effective channel information.

4. The method of claim 2 or 3, wherein the time domain Doppler component is represented by a phase offset between adjacent time points for transmitting the downlink pilot signals; or, the time domain Doppler component is represented by a basis vector.

5. The method according to any of claims 2 to 4, wherein the time domain Doppler component meets at least one of following conditions:

in a case where the downlink data transmission is single-layer transmission, time domain Doppler components corresponding to different polarization directions are the same or different;

time domain Doppler components corresponding to different reference signal ports are the same or different; or

time domain Doppler components corresponding to different time-frequency components are the same or different;

wherein, the time-frequency component is composed of the frequency domain basis vector and the time domain Doppler component;

wherein, in a case where the downlink data transmission is multi-layer transmission, time domain Doppler components corresponding to different transmission layers are the same or different.

6. The method according to claim 4, wherein the time domain Doppler component is represented by the phase offset, and an expression of the time domain Doppler component is:

$$D = \begin{bmatrix} e^{j\varphi_{1,1}} & \cdots & e^{j\varphi_{1,M}} \\ \vdots & \ddots & \vdots \\ e^{j\varphi_{2L,1}} & \cdots & e^{j\varphi_{1,M}} \end{bmatrix};$$

wherein, $\varphi_{x,y}$ represents a phase offset value corresponding to an x^{th} reference signal port and a y^{th} frequency domain basis vector, the parameter L represents a number of the reference signal ports selected by the terminal, and the parameter M represents a number of the frequency domain basis vectors selected by the terminal, and wherein the parameter L and the parameter M are positive integers;

wherein reporting the CSI to the network device comprises:

in a case of reporting the time domain Doppler component to the network device, reporting the phase offset value corresponding to the x^{th} reference signal port and the y^{th}

frequency domain basis vector that meets a following condition:

an amplitude of a combination coefficient corresponding to the x^{th} reference signal port and the y^{th} frequency domain basis vector being not 0.

7. The method according to claim 4, wherein the time domain Doppler component is represented by the basis vector, and an expression of the time domain Doppler component is:

$W_d = [f_{d,1} \quad \ldots \quad f_{d,K}]$;

wherein, K basis vectors in the W_d are selected by the terminal from candidate basis vectors; or, the K basis vectors in the W_d are fixed or predefined basis vectors.

8. The method according to claim 4, wherein the time domain Doppler component is represented by the basis vector, and the basis vector comprises at least one of:

a discrete Fourier transform (DFT) basis vector;

a discrete cosine transform (DCT) basis vector; or

a polynomial basis vector.

9. The method according to any of claims 1 to 8, wherein the parameter T is determined in at least one of following ways:

being configured by the network device; or

being predefined through negotiation between the terminal device and the network device.

10. The method according to any of claims 2 to 8, wherein, in a case where the parameter T and/or the parameter K are configured by the network device, the parameter T and/or the parameter K are configured for the terminal by the network device through at least one of following signalings:

a radio resource control (RRC) signaling;

a medium access control-control unit (MAC-CE) signaling; or

downlink control information (DCI).

11. The method according to any of claims 2 to 8, wherein the reference signal port comprises at least one of:

a channel status information-reference signal (CSI-RS) port; or

a demodulation reference signal (DMRS) port.

12. The method according to any of claims 1 to 11, wherein the downlink pilot signal comprises at least one of:

a channel status information-reference signal (CSI-RS);

a demodulation reference signal (DMRS); or

a combination of the CSI-RS and the DMRS.

13. A method for determining a precoding matrix, performed by a network device, comprising:

receiving an uplink reference signal transmitted by a terminal;

estimating uplink channel information according to the uplink reference signal, and determining a beam for transmitting downlink pilot signals according to the uplink channel information;

transmitting the downlink pilot signals beamformed with the beam to the terminal at T consecutive time points;

receiving CSI corresponding to the T consecutive time points reported by the terminal; and

determining a precoding matrix for downlink data transmission at a time point t according to the CSI;

wherein the CSI is determined by the terminal according to the beamformed downlink pilot signals, the time point t is after the T consecutive time points, and T is a positive integer.

14. The method according to claim 13, wherein the CSI comprises at least one of:

port selection indication information;

frequency domain basis vector indication information;

time domain Doppler component indication information; or

combination coefficient indication information;

wherein, the port selection indication information is used to indicate L reference signal ports selected by the terminal, the frequency domain basis vector indication information is used to indicate M frequency domain basis vectors selected by the terminal, the time domain Doppler component indication information is used to indicate K time domain Doppler components selected by the terminal, and the combination coefficient indication information is used to indicate a combination coefficient determined by the terminal, wherein the parameter L, the parameter M and the parameter K are positive integers.

15. The method according to claim 14, wherein the time domain Doppler component is represented by the basis vector, and an expression of the time domain Doppler component is:

$W_d = [f_{d,1} \quad \ldots \quad f_{d,K}]$;

wherein, K basis vectors in the W_d are selected by the terminal from candidate basis

vectors; or, the K basis vectors in the W_d are fixed or predefined basis vectors.

16. The method according to claim 15, wherein the time domain Doppler component is represented by a discrete Fourier transform (DFT) basis vector, and time intervals between adjacent time points in the T consecutive time points are equal, t=T+n, indicating that the time point t is a time point after a last time point in the T time points, with a time interval from the last time point in the T time points being n times of a target time interval, wherein the target time interval is the time interval between adjacent time points in the T consecutive time points, and n is a positive integer; and

wherein determining the precoding matrix for downlink data transmission at the time point t according to the CSI comprises:

determining the precoding matrix for downlink data transmission at the time point t according to the CSI by a following equation:

$$W_t = \sqrt{d} W_1 \tilde{\tilde{W}}_2 \left(\begin{bmatrix} f_{d,1}((t-T) \bmod T) e^{j\frac{2\pi k_1 \left\lfloor \frac{t-T}{T} \right\rfloor + 1}{O_3}} \\ \vdots \\ f_{d,K}((t-T) \bmod T) e^{j\frac{2\pi k_K \left\lfloor \frac{t-T}{T} \right\rfloor + 1}{O_3}} \end{bmatrix} \otimes W_f \right)^H ;$$

wherein, W_1 represents a port selection matrix corresponding to the reference signal port, $\tilde{\tilde{W}}_2$ represents a matrix of the combination coefficients, W_f represents a matrix of the frequency domain basis vectors, $f_{d,k}(T)$ represents elements in a T^{th} row of the DFT basis vector, k_K represents an index value of a K^{th} DFT basis vector, $\sqrt{d}$ represents a power normalization factor, O_3 represents an oversampling factor, and H represents a conjugate transpose of a matrix.

17. The method according to any of claims 14 to 16, wherein the reference signal port comprises at least one of:

a channel status information-reference signal (CSI-RS) port; or

a demodulation reference signal (DMRS) port.

18. The method according to any of claims 13 to 17, wherein the downlink pilot signal comprises at least one of:

a channel status information-reference signal (CSI-RS);

a demodulation reference signal (DMRS); or

a combination of the CSI-RS and the DMRS.

19. A communication device, comprising:

a processor;

a transceiver coupled to the processor;

a memory for storing executable instructions for the processor;

wherein the processor is configured to load and execute the executable instructions to perform the method for reporting CSI according to any one of claims 1 to 12 or the method for determining a precoding matrix according to any one of claims 13 to 18.

20. A computer-readable storage medium, having executable instructions stored thereon that, when loaded and executed by a processor, the method for reporting CSI according to any one of claims 1 to 12 or the method for determining a precoding matrix according to any one of claims 13 to 18 is performed.