

WHAT IS CLAIMED IS:

1. A method of decoding video data, the method comprising:
 - determining a quantization parameter predictor for a chroma block of the video data based on a quantization parameter for a corresponding luma block;
 - determining a block level quantization parameter offset for the chroma block;
 - determining a quantization parameter for the chroma block based on the block level quantization parameter offset and the quantization parameter predictor;
 - determining a residual block based on the quantization parameter; and
 - reconstructing the chroma block based on the residual block.
2. The method of claim 1, wherein determining the block level quantization parameter offset comprises:
 - constructing a list of quantization parameter offsets;
 - receiving an index into the list of quantization parameter offsets; and
 - determining the block level quantization parameter offset based on the index into the list of quantization parameter offsets.
3. The method of claim 1, wherein the chroma block is a first chroma block of a first chroma component, the block level quantization parameter offset is a first block level quantization parameter for the first chroma block, the quantization parameter for the chroma block is a first quantization parameter for the first chroma block, and the residual block is a first residual block, the method further comprising:
 - determining a second block level quantization parameter offset for a second chroma block of a second chroma component;
 - determining a second quantization parameter for the second chroma block based on the second block level quantization parameter offset and the same quantization parameter predictor;
 - determining a second residual block based on the second quantization parameter;
 - and
 - reconstructing the second chroma block based on the second residual block.

4. The method of claim 3, wherein determining the first block level quantization parameter offset comprises determining the first block level quantization parameter offset from an index into a first list of quantization parameter offsets for the first chroma component, and wherein determining the second block level quantization parameter offset comprises determining the second block level quantization parameter offset from the same index into a second list of quantization parameter offsets for the second chroma component.
5. The method of claim 1, wherein the chroma block comprises a JointCbCr chroma block.
6. The method of claim 1, further comprising:
 - receiving at least one of a first quantization parameter offset for chroma component in a picture parameter set or a second quantization parameter offset for chroma component in a slice parameter set,
 - wherein determining the quantization parameter for the chroma block comprises determining the quantization parameter for the chroma block based on the block level quantization parameter offset, at least one of the first quantization parameter offset or the second quantization parameter offset, and the quantization parameter predictor.
7. The method of claim 1, further comprising:
 - receiving a syntax element indicating that the block level quantization parameter offset is to be used for determining the block level quantization parameter offset for the chroma block,
 - wherein determining the block level quantization parameter offset for the chroma block comprises determining the block level quantization parameter offset based on the syntax element indicating that the block level quantization parameter offset is to be used.
8. The method of claim 1, wherein the block level quantization parameter offset is different for at least one other chroma block in same slice or picture as the chroma block and is determined on a chroma block-by-chroma block basis.

9. The method of claim 1, wherein determining the residual block based on the quantization parameter comprises:
- inverse-quantizing a plurality of coefficient values based on the quantization parameter to generate inverse-quantized coefficient values; and
 - inverse-transforming the inverse-quantized coefficient values to generate the residual block.
10. The method of claim 1, wherein reconstructing the chroma block comprises:
- determining a prediction block for the chroma block; and
 - adding the residual block to the prediction block to reconstruct the chroma block.
11. A device for decoding video data, the device comprising:
- memory configured to store a quantization parameter for a corresponding luma block of a chroma block of the video data; and
 - processing circuitry coupled to the memory and configured to:
 - determine a quantization parameter predictor for the chroma block of the video data based on the quantization parameter for the corresponding luma block;
 - determine a block level quantization parameter offset for the chroma block;
 - determine a quantization parameter for the chroma block based on the block level quantization parameter offset and the quantization parameter predictor;
 - determine a residual block based on the quantization parameter; and
 - reconstruct the chroma block based on the residual block.
12. The device of claim 11, wherein to determine the block level quantization parameter offset, the processing circuitry is configured to:
- construct a list of quantization parameter offsets;
 - receive an index into the list of quantization parameter offsets; and
 - determine the block level quantization parameter offset based on the index into the list of quantization parameter offsets.

13. The device of claim 11, wherein the chroma block is a first chroma block of a first chroma component, the block level quantization parameter offset is a first block level quantization parameter for the first chroma block, the quantization parameter for the chroma block is a first quantization parameter for the first chroma block, and the residual block is a first residual block, and wherein the processing circuitry is configured to:

determine a second block level quantization parameter offset for a second chroma block of a second chroma component;

determine a second quantization parameter for the second chroma block based on the second block level quantization parameter offset and the same quantization parameter predictor;

determine a second residual block based on the second quantization parameter;

and

reconstruct the second chroma block based on the second residual block.

14. The device of claim 13, wherein to determine the first block level quantization parameter offset, the processing circuitry is configured to determine the first block level quantization parameter offset from an index into a first list of quantization parameter offsets for the first chroma component, and wherein to determine the second block level quantization parameter offset, the processing circuitry is configured to determine the second block level quantization parameter offset from the same index into a second list of quantization parameter offsets for the second chroma component.

15. The device of claim 11, wherein the chroma block comprises a JointCbCr chroma block.

16. The device of claim 11, wherein the processing circuitry is configured to:
receive at least one of a first quantization parameter offset for chroma component in a picture parameter set or a second quantization parameter offset for chroma component in a slice parameter set,
wherein to determine the quantization parameter for the chroma block, the processing circuitry is configured to determine the quantization parameter for the chroma block based on the block level quantization parameter offset, at least one of the first quantization parameter offset or the second quantization parameter offset, and the quantization parameter predictor.
17. The device of claim 11, wherein the processing circuitry is configured to:
receive a syntax element indicating that the block level quantization parameter offset is to be used for determining the block level quantization parameter offset for the chroma block,
wherein to determine the block level quantization parameter offset for the chroma block, the processing circuitry is configured to determine the block level quantization parameter offset based on the syntax element indicating that the block level quantization parameter offset is to be used.
18. The device of claim 11, wherein the block level quantization parameter offset is different for at least one other chroma block in same slice or picture as the chroma block and is determined on a chroma block-by-chroma block basis.
19. The device of claim 11, wherein to determine the residual block based on the quantization parameter, the processing circuitry is configured to:
inverse-quantize a plurality of coefficient values based on the quantization parameter to generate inverse-quantized coefficient values; and
inverse-transform the inverse-quantized coefficient values to generate the residual block.

20. The device of claim 11, wherein to reconstruct the chroma block, the processing circuitry is configured to:

determine a prediction block for the chroma block; and
add the residual block to the prediction block to reconstruct the chroma block.

21. The device of claim 11, comprising a display configured to display decoded video data.

22. The device of claim 11, wherein the device comprises one of a camera, a computer, a wireless communication device, a broadcast receiver device, or a set-top box.

23. A computer-readable storage medium storing instructions thereon that when executed cause one or more processors of a device for decoding video data to:

determine a quantization parameter predictor for a chroma block of the video data based on a quantization parameter for a corresponding luma block;
determine a block level quantization parameter offset for the chroma block;
determine a quantization parameter for the chroma block based on the block level quantization parameter offset and the quantization parameter predictor;
determine a residual block based on the quantization parameter; and
reconstruct the chroma block based on the residual block.

24. The computer-readable storage medium of claim 23, wherein the instructions that cause the one or more processors to determine the block level quantization parameter offset comprise instructions that cause the one or more processors to:

construct a list of quantization parameter offsets;
receive an index into the list of quantization parameter offsets; and
determine the block level quantization parameter offset based on the index into the list of quantization parameter offsets.

25. The computer-readable storage medium of claim 23, wherein the chroma block is a first chroma block of a first chroma component, the block level quantization parameter offset is a first block level quantization parameter for the first chroma block, the quantization parameter for the chroma block is a first quantization parameter for the first chroma block, and the residual block is a first residual block, and wherein the instructions comprise instructions that cause the one or more processors to:

- determine a second block level quantization parameter offset for a second chroma block of a second chroma component;

- determine a second quantization parameter for the second chroma block based on the second block level quantization parameter offset and the same quantization parameter predictor;

- determine a second residual block based on the second quantization parameter;

and

- reconstruct the second chroma block based on the second residual block.

26. The computer-readable storage medium of claim 25, wherein the instructions that cause the one or more processors to determine the first block level quantization parameter offset comprise instructions that cause the one or more processors to determine the first block level quantization parameter offset from an index into a first list of quantization parameter offsets for the first chroma component, and wherein the instructions that cause the one or more processors to determine the second block level quantization parameter offset comprise instructions that cause the one or more processors to determine the second block level quantization parameter offset from the same index into a second list of quantization parameter offsets for the second chroma component.

27. The computer-readable storage medium of claim 23, wherein the chroma block comprises a JointCbCr chroma block.

28. The computer-readable storage medium of claim 23, further comprising instructions that cause the one or more processors to:

receive at least one of a first quantization parameter offset for chroma component in a picture parameter set or a second quantization parameter offset for chroma component in a slice parameter set,

wherein the instructions that cause the one or more processors to determine the quantization parameter for the chroma block comprise instructions that cause the one or more processors to determine the quantization parameter for the chroma block based on the block level quantization parameter offset, at least one of the first quantization parameter offset or the second quantization parameter offset, and the quantization parameter predictor.

29. A device for decoding video data, the device comprising:

means for determining a quantization parameter predictor for a chroma block of the video data based on a quantization parameter for a corresponding luma block;

means for determining a block level quantization parameter offset for the chroma block;

means for determining a quantization parameter for the chroma block based on the block level quantization parameter offset and the quantization parameter predictor;

means for determining a residual block based on the quantization parameter; and

means for reconstructing the chroma block based on the residual block.

30. The device of claim 29, wherein the means for determining the block level quantization parameter offset comprises:

means for constructing a list of quantization parameter offsets;

means for receiving an index into the list of quantization parameter offsets; and

means for determining the block level quantization parameter offset based on the index into the list of quantization parameter offsets.

31. The device of claim 29, wherein the chroma block is a first chroma block of a first chroma component, the block level quantization parameter offset is a first block level quantization parameter for the first chroma block, the quantization parameter for the chroma block is a first quantization parameter for the first chroma block, and the residual block is a first residual block, the device further comprising:

means for determining a second block level quantization parameter offset for a second chroma block of a second chroma component;

means for determining a second quantization parameter for the second chroma block based on the second block level quantization parameter offset and the same quantization parameter predictor;

means for determining a second residual block based on the second quantization parameter; and

means for reconstructing the second chroma block based on the second residual block.

32. The device of claim 31, wherein the means for determining the first block level quantization parameter offset comprises means for determining the first block level quantization parameter offset from an index into a first list of quantization parameter offsets for the first chroma component, and wherein the means for determining the second block level quantization parameter offset comprises means for determining the second block level quantization parameter offset from the same index into a second list of quantization parameter offsets for the second chroma component.

33. The device of claim 29, wherein the chroma block comprises a JointCbCr chroma block.

34. The device of claim 29, further comprising:
means for receiving at least one of a first quantization parameter offset for chroma component in a picture parameter set or a second quantization parameter offset for chroma component in a slice parameter set,
wherein the means for determining the quantization parameter for the chroma block comprises means for determining the quantization parameter for the chroma block based on the block level quantization parameter offset, at least one of the first quantization parameter offset or the second quantization parameter offset, and the quantization parameter predictor.
35. The device of claim 29, further comprising:
means for receiving a syntax element indicating that the block level quantization parameter offset is to be used for determining the block level quantization parameter offset for the chroma block,
wherein the means for determining the block level quantization parameter offset for the chroma block comprises means for determining the block level quantization parameter offset based on the syntax element indicating that the block level quantization parameter offset is to be used.
36. A method of encoding video data, the method comprising:
determining a quantization parameter predictor for a chroma block of the video data based on a quantization parameter for a corresponding luma block;
determining a block level quantization parameter offset for the chroma block;
determining a quantization parameter for the chroma block based on the block level quantization parameter offset and the quantization parameter predictor;
quantizing coefficient values for a residual block based on the determined quantization parameter for the chroma block; and
signaling information indicative of the quantized coefficient values.
37. The method of claim 36, further comprising:
constructing a list of quantization parameter offsets;
determining an index into the list of quantization parameter offsets for the determined block level quantization parameter offset; and
signaling information indicative of the index.

38. The method of claim 36, wherein the chroma block is a first chroma block of a first chroma component, the block level quantization parameter offset is a first block level quantization parameter for the first chroma block, the quantization parameter for the chroma block is a first quantization parameter for the first chroma block, and the residual block is a first residual block, the method further comprising:

determining a second block level quantization parameter offset for a second chroma block of a second chroma component;

determining a second quantization parameter for the second chroma block based on the second block level quantization parameter offset and the same quantization parameter predictor;

quantizing coefficient values for a second residual block based on the second quantization parameter; and

signaling information indicative of the quantized coefficient values for the second residual block.

39. The method of claim 36, further comprising:

signaling at least one of a first quantization parameter offset for chroma component in a picture parameter set or a second quantization parameter offset for chroma component in a slice parameter set,

wherein determining the quantization parameter for the chroma block comprises determining the quantization parameter for the chroma block based on the block level quantization parameter offset, at least one of the first quantization parameter offset or the second quantization parameter offset, and the quantization parameter predictor.

40. The method of claim 36, further comprising:

signaling a syntax element indicating that the block level quantization parameter offset is to be used for determining the block level quantization parameter offset for the chroma block.

41. A device for encoding video data, the device comprising:
- memory configured to store a quantization parameter for a corresponding luma block of a chroma block of the video data; and
 - processing circuitry coupled to the memory and configured to:
 - determine a quantization parameter predictor for a chroma block of the video data based on a quantization parameter for a corresponding luma block;
 - determine a block level quantization parameter offset for the chroma block;
 - determine a quantization parameter for the chroma block based on the block level quantization parameter offset and the quantization parameter predictor;
 - quantize coefficient values for a residual block based on the determined quantization parameter for the chroma block; and
 - signal information indicative of the quantized coefficient values.
42. The device of claim 41, wherein the processing circuitry is configured to:
- construct a list of quantization parameter offsets;
 - determine an index into the list of quantization parameter offsets for the determined block level quantization parameter offset; and
 - signal information indicative of the index.

43. The device of claim 41, wherein the chroma block is a first chroma block of a first chroma component, the block level quantization parameter offset is a first block level quantization parameter for the first chroma block, the quantization parameter for the chroma block is a first quantization parameter for the first chroma block, and the residual block is a first residual block, and wherein the processing circuitry is configured to:

- determine a second block level quantization parameter offset for a second chroma block of a second chroma component;

- determine a second quantization parameter for the second chroma block based on the second block level quantization parameter offset and the same quantization parameter predictor;

- quantize coefficient values for a second residual block based on the second quantization parameter; and

- signal information indicative of the quantized coefficient values for the second residual block.

44. The device of claim 41, wherein the processing circuitry is configured to:

- signal at least one of a first quantization parameter offset for chroma component in a picture parameter set or a second quantization parameter offset for chroma component in a slice parameter set,

- wherein to determine the quantization parameter for the chroma block, the processing circuitry is configured to determine the quantization parameter for the chroma block based on the block level quantization parameter offset, at least one of the first quantization parameter offset or the second quantization parameter offset, and the quantization parameter predictor.

45. The device of claim 41, wherein the processing circuitry is configured to:

- signal a syntax element indicating that the block level quantization parameter offset is to be used for determining the block level quantization parameter offset for the chroma block.