CLAIMS

1. A method of video processing, comprising:

performing a conversion between a video comprising a video picture that includes one or more subpictures and a bitstream of the video;

wherein the bitstream conforms to a format rule; and

wherein the format rule specifies that a first syntax element indicating whether an operation is performed across a boundary of a subpicture in the coded layer video sequence is selectively included responsive to a number of subpictures in the video picture.

2. The method of claim 1, wherein the format rule specifies that the first syntax element further indicates all boundaries of the subpicture in the coded layer video sequence are treated as picture boundaries.

3. The method of claim 1 or 2, wherein the operation comprises at least one of an intra prediction, an inter prediction, or an in-loop filtering operation.

4. The method of claim 3, wherein the format rule specifies that the first syntax element is omitted in the bitstream in case the number of subpictures in the video picture is 1.

5. The method of claim 4, wherein a value of the first syntax element is inferred to be 1 indicating that no in-loop filtering operation is performed across a boundary of the subpicture.

6. The method of any of claims 1 to 5, wherein the first syntax element is in a sequence parameter set.

7. The method of claim 6, wherein the first syntax element comprises sps_independent_subpics_flag.

8. The method of any of claims 1 to 7, wherein the format rule further specifies that the number of subpictures in the video picture in the coded layer video sequence determines a manner of

~~indicating a second syntax element indicating whether the one or more subpictures of the video picture are treated as one or more pictures for the conversion, wherein an in-loop filtering operation is not applied in the conversion.~~

~~9. The method of claim 8, wherein, in case the number of subpictures in the picture is 1, a value of the second syntax element is inferred to be 1 indicating that the subpicture of the video picture is treated as a picture for the conversion.~~

~~10. The method of claim 8, wherein, in case the number of subpictures in the picture is 1, a value of the second syntax element is required to be 1 indicating that the subpicture of the video picture is treated as a picture for the conversion.~~

~~11. The method of any of claims 1 to 10, wherein the format rule further specifies that the number of subpictures in the video picture in the coded layer video sequence determines a manner of indicating a third syntax element indicating whether an in-loop filtering operation is enabled across a boundary of a subpicture.~~

~~12. The method of claim 11, wherein the third syntax element further indicates whether the in-loop filtering operation is applicable across a boundary of the subpicture.~~

~~13. The method of claim 11, wherein, in case the number of subpictures in the picture is 1, a value of the third syntax element is inferred to be 0 indicating that the in-loop filtering operation is disabled across a boundary of the subpicture.~~

~~14. The method of claim 13, wherein the third syntax element being inferred to be 0 further indicates the in-loop filtering operation is not applicable across a boundary of the subpicture.~~

~~15. The method of claim 11, wherein, in case the number of subpictures in the picture is 1, a value of the third syntax element is required to be 0 indicating that the in-loop filtering operation is disabled across a boundary of the subpicture.~~

16. The method of claim 15, wherein the third syntax element being required to be 0 further indicates the in-loop filtering operation is not applicable across a boundary of the subpicture.

17. The method of any of claims 1 to 16, wherein the number of subpictures is indicated by a syntax element sps_num_subpics_nimus1.

18. The method of claim 8 or 11, wherein the number of subpictures is indicated by a syntax element one_subpic_per_pic_contraint_flag.

19. A method of video processing, comprising:
performing a conversion between a video comprising a video picture that includes one or more subpictures and a bitstream of the video;
wherein the bitstream conforms to a format rule; and
wherein the format rule specifies that a number of subpictures in the video picture in the bitstream is constrained by a constraint flag in the bitstream.

20. The method of claim 19, wherein the constraint flag comprises one_subpic_per_pic_contraint_flag.

21. The method of claim 20, wherein the number of subpictures is required to be 1 in case the constraint flag has a value of 1.

22. A method of video processing, comprising:
performing a conversion between a video comprising a video picture that includes one or more subpictures and a bitstream of the video;
wherein the bitstream conforms to a format rule; and
wherein the format rule specifies that a number of slices in a subpicture determines a manner of signaling a syntax element indicating a width of a slice, wherein the width of the slice is specified as a number of tile columns.

~~23. The method of claim 22, wherein the syntax element is omitted in the bitstream, and wherein the width of the slice is inferred in case the number of slices in the subpicture is 1.~~

~~24. The method of claim 23, wherein the width of the slice is inferred to be 1 tile column.~~

~~25. The method of any of claims 1 to 24, wherein the conversion comprises encoding the video into the bitstream.~~

~~26. The method of any of claims 1 to 24, wherein the conversion comprises decoding the video from the bitstream.~~

~~27. A method for storing bitstream of a video, comprising:~~
~~generating a bitstream of the video from a video picture that includes a video slice, wherein the bitstream conforms to a format rule specifying that a syntax element indicating whether an operation is performed across a boundary of a subpicture in the coded layer video sequence is selectively included responsive to a number of subpictures in the video picture; and~~
~~storing the bitstream in a non-transitory computer-readable recording medium.~~

~~28. A method for storing bitstream of a video, comprising:~~
~~generating a bitstream of the video from a video picture that includes one or more subpictures, wherein the bitstream conforms to a format rule specifying that a number of subpictures in the video picture in the bitstream is constrained by a constraint flag in the bitstream; and~~
~~storing the bitstream in a non-transitory computer-readable recording medium.~~

~~29. A method for storing bitstream of a video, comprising:~~
~~generating a bitstream of the video from a video picture that includes one or more subpictures, wherein the bitstream conforms to a format rule specifying that a number of slices in a subpicture determines a manner of signaling a syntax element indicating a width of a slice, wherein the width of the slice is specified as a number of tile columns; and~~
~~storing the bitstream in a non-transitory computer-readable recording medium.~~

30. A video decoding apparatus comprising a processor configured to implement a method recited in one or more of claims 1 to 29.

31. A video encoding apparatus comprising a processor configured to implement a method recited in one or more of claims 1 to 29.

32. A computer program product having computer code stored thereon, the code, when executed by a processor, causes the processor to implement a method recited in any of claims 1 to 29.

33. A non-transitory computer-readable recording medium storing a bitstream of a video which is generated by a method performed by a video processing apparatus, wherein the method comprises:

generating a bitstream of the video from a video picture that includes a video slice, wherein the bitstream conforms to a format rule specifying that a syntax element indicating whether an operation is performed across a boundary of a subpicture in the coded layer video sequence is selectively included responsive to a number of subpictures in the video picture.

34. A non-transitory computer-readable recording medium storing a bitstream of a video which is generated by a method performed by a video processing apparatus, wherein the method comprises:

generating a bitstream of the video from a video picture that includes one or more subpictures, wherein the bitstream conforms to a format rule specifying that a number of subpictures in the video picture in the bitstream is constrained by a constraint flag in the bitstream.

35. A non-transitory computer-readable recording medium storing a bitstream of a video which is generated by a method performed by a video processing apparatus, wherein the method comprises:

generating a bitstream of the video from a video picture that includes one or more subpictures, wherein the bitstream conforms to a format rule specifying that a number of slices in a subpicture determines a manner of signaling a syntax element indicating a width of a slice, wherein the width of the slice is specified as a number of tile columns.

~~36. A method, an apparatus, a bitstream generated according to a method, or a system described in the present document.~~

1. A method for processing video data, comprising:

performing a conversion between a video comprising a video picture that includes one or more subpictures and a bitstream of the video;

wherein the bitstream conforms to a format rule;

wherein the format rule specifies that a first syntax element is selectively present in a sequence parameter set of the bitstream based on a number of subpictures in the video picture; and

wherein the first syntax element indicates whether an in-loop filtering operation is allowed to be performed across subpicture boundaries in a coded layer video sequence (CLVS) and whether all subpicture boundaries in the CLVS are treated as picture boundaries.

2. The method of claim 1, wherein the format rule specifies that in case the number of the subpictures in the video picture is 1, the first syntax element is not present in the sequence parameter set, and a value of the first syntax element is inferred to be equal to 1, and

wherein in case the value of the first syntax element is inferred to be equal to 1, all subpicture boundaries in the CLVS are treated as picture boundaries and no in-loop filtering operation is performed across subpicture boundaries.

3. The method of claim 1 or 2, wherein the first syntax element comprises sps_independent_subpics_flag.

4. The method of any one of claims 1-3, wherein the number of subpictures in the video picture is indicated by a second syntax element in the sequence parameter set, which plus 1 specifies the number of subpictures in each video picture in the CLVS.

5. The method of any one of claims 1-4, wherein the format rule further specifies that the number of subpictures in the video picture determines a manner of indicating a third syntax element, which indicates whether a subpicture of each video picture in the CLVS is treated as a picture in the conversion excluding the in-loop filtering operation.

6. The method of claim 5, wherein in case the number of subpictures in the video picture is 1, a value of the third syntax element is inferred to be equal to 1, and

wherein in case the value of the third syntax element is equal to 1, a subpicture of each video picture in the CLVS is treated as a picture in the conversion excluding the in-loop filtering operation.

7. The method of any one of claims 1-6, wherein the format rule further specifies that the number of subpictures in the video picture determines a manner of indicating a fourth syntax element, which indicates whether the in-loop filtering operation is allowed to be performed across subpicture boundaries.

8. The method of claim 7, wherein in case the number of subpictures in the video picture is 1, a value of the fourth syntax element is inferred to be equal to 0, and

wherein in case the value of the fourth syntax element is equal to 0, the in-loop filtering operation across subpicture boundaries is disabled.

9. The method of any one of claims 1-8, wherein the conversion comprises encoding the video into the bitstream.

10. The method of any one of claims 1-8, wherein the conversion comprises decoding the video from the bitstream.

11. An apparatus for processing video data comprising a processor and a non-transitory memory with instructions thereon, wherein the instructions upon execution by the processor, cause the processor to:

perform a conversion between a video comprising a video picture that includes one or more subpictures and a bitstream of the video;

wherein the bitstream conforms to a format rule;

wherein the format rule specifies that a first syntax element is selectively present in a sequence parameter set of the bitstream based on a number of subpictures in the video picture; and

wherein the first syntax element indicates whether an in-loop filtering operation is allowed to be performed across subpicture boundaries in a coded layer video sequence (CLVS) and whether all subpicture boundaries in the CLVS are treated as picture boundaries.

12. The apparatus of claim 11, wherein the format rule specifies that in case the number of the subpictures in the video picture is 1, the first syntax element is not present in the sequence parameter set, and a value of the first syntax element is inferred to be equal to 1, and

wherein in case the value of the first syntax element is inferred to be equal to 1, all subpicture boundaries in the CLVS are treated as picture boundaries and no in-loop filtering operation is performed across subpicture boundaries.

13. The apparatus of claim 11 or 12, wherein the first syntax element comprises sps_independent_subpics_flag.

14. The apparatus of any one of claims 11-13, wherein the number of subpictures in the video picture is indicated by a second syntax element in the sequence parameter set, which plus 1 specifies the number of subpictures in each video picture in the CLVS.

15. The apparatus of any one of claims 11-14, wherein the format rule further specifies that the number of subpictures in the video picture determines a manner of indicating a third syntax element, which indicates whether a subpicture of each video picture in the CLVS is treated as a picture in the conversion excluding the in-loop filtering operation;

wherein in case the number of subpictures in the video picture is 1, a value of the third syntax element is inferred to be equal to 1, and

wherein in case the value of the third syntax element is equal to 1, a subpicture of each video picture in the CLVS is treated as a picture in the conversion excluding the in-loop filtering operation.

16. The apparatus of any one of claims 11-15, wherein the format rule further specifies that the number of subpictures in the video picture determines a manner of indicating a fourth syntax

element, which indicates whether the in-loop filtering operation is allowed to be performed across subpicture boundaries;

wherein in case the number of subpictures in the video picture is 1, a value of the fourth syntax element is inferred to be equal to 0, and

wherein in case the value of the fourth syntax element is equal to 0, the in-loop filtering operation across subpicture boundaries is disabled.

17. A non-transitory computer-readable storage medium storing instructions that cause a processor to:

perform a conversion between a video comprising a video picture that includes one or more subpictures and a bitstream of the video;

wherein the bitstream conforms to a format rule;

wherein the format rule specifies that a first syntax element is selectively present in a sequence parameter set of the bitstream based on a number of subpictures in the video picture; and

wherein the first syntax element indicates whether an in-loop filtering operation is allowed to be performed across subpicture boundaries in a coded layer video sequence (CLVS) and whether all subpicture boundaries in the CLVS are treated as picture boundaries.

18. The non-transitory computer-readable storage medium of claim 17, wherein the format rule specifies that in case the number of the subpictures in the video picture is 1, the first syntax element is not present in the sequence parameter set, and a value of the first syntax element is inferred to be equal to 1, and

wherein in case the value of the first syntax element is inferred to be equal to 1, all subpicture boundaries in the CLVS are treated as picture boundaries and no in-loop filtering operation is performed across subpicture boundaries;

wherein the first syntax element comprises sps_independent_subpics_flag;

wherein the number of subpictures in the video picture is indicated by a second syntax element in the sequence parameter set, which plus 1 specifies the number of subpictures in each video picture in the CLVS;

wherein the format rule further specifies that the number of subpictures in the video picture determines a manner of indicating a third syntax element, which indicates whether a subpicture of

each video picture in the CLVS is treated as a picture in the conversion excluding the in-loop filtering operation;

wherein in case the number of subpictures in the video picture is 1, a value of the third syntax element is inferred to be equal to 1, and

wherein in case the value of the third syntax element is equal to 1, a subpicture of each video picture in the CLVS is treated as a picture in the conversion excluding the in-loop filtering operation;

wherein the format rule further specifies that the number of subpictures in the video picture determines a manner of indicating a fourth syntax element, which indicates whether the in-loop filtering operation is allowed to be performed across subpicture boundaries; and

wherein in case the number of subpictures in the video picture is 1, a value of the fourth syntax element is inferred to be equal to 0, and

wherein in case the value of the fourth syntax element is equal to 0, the in-loop filtering operation across subpicture boundaries is disabled.

19. A non-transitory computer-readable recording medium storing a bitstream of a video which is generated by a method performed by a video processing apparatus, wherein the method comprises:

generating the bitstream of the video comprising a video picture that includes one or more subpictures,

wherein the bitstream conforms to a format rule;

wherein the format rule specifies that a first syntax element is selectively present in a sequence parameter set of the bitstream based on a number of subpictures in the video picture; and

wherein the first syntax element indicates whether an in-loop filtering operation is allowed to be performed across subpicture boundaries in a coded layer video sequence (CLVS) and whether all subpicture boundaries in the CLVS are treated as picture boundaries.

20. The non-transitory computer-readable recording medium of claim 19, wherein the format rule specifies that in case the number of the subpictures in the video picture is 1, the first syntax element is not present in the sequence parameter set, and a value of the first syntax element is inferred to be equal to 1, and

wherein in case the value of the first syntax element is inferred to be equal to 1, all subpicture boundaries in the CLVS are treated as picture boundaries and no in-loop filtering operation is performed across subpicture boundaries;

wherein the first syntax element comprises sps_independent_subpics_flag;

wherein the number of subpictures in the video picture is indicated by a second syntax element in the sequence parameter set, which plus 1 specifies the number of subpictures in each video picture in the CLVS;

wherein the format rule further specifies that the number of subpictures in the video picture determines a manner of indicating a third syntax element, which indicates whether a subpicture of each video picture in the CLVS is treated as a picture in the conversion excluding the in-loop filtering operation;

wherein in case the number of subpictures in the video picture is 1, a value of the third syntax element is inferred to be equal to 1, and

wherein in case the value of the third syntax element is equal to 1, a subpicture of each video picture in the CLVS is treated as a picture in the conversion excluding the in-loop filtering operation;

wherein the format rule further specifies that the number of subpictures in the video picture determines a manner of indicating a fourth syntax element, which indicates whether the in-loop filtering operation is allowed to be performed across subpicture boundaries; and

wherein in case the number of subpictures in the video picture is 1, a value of the fourth syntax element is inferred to be equal to 0, and

wherein in case the value of the fourth syntax element is equal to 0, the in-loop filtering operation across subpicture boundaries is disabled.