CLAIMS

1. A method comprising:

receiving audio data comprising a first set of frequency coefficients and a second set of frequency coefficients;

estimating, based on at least part of the first set of frequency coefficients, spatial parameters for at least part of the second set of frequency coefficients; and

applying the estimated spatial parameters to the second set of frequency coefficients to generate a modified second set of frequency coefficients,

wherein the first set of frequency coefficients corresponds to a first frequency range and the second set of frequency coefficients corresponds to a second frequency range;

wherein the audio data comprises data corresponding to individual channels and a coupled channel, and wherein the first frequency range corresponds to an individual channel frequency range and the second frequency range corresponds to a coupled channel frequency range;

wherein the audio data comprises frequency coefficients in the first frequency range for two or more channels; and

wherein the estimating process involves:

creating a composite coupling channel based on audio data of the individual channels in the first frequency range, which involves calculating combined frequency coefficients of the composite coupling channel based on frequency coefficients of the two or more channels in the first frequency range; and

computing, for at least a first channel, cross-correlation coefficients between frequency coefficients of the first channel and the combined frequency coefficients.

2. The method of claim 1, wherein the applying process involves applying the estimated spatial parameters on a per-channel basis.

3. The method of claim 1, wherein the cross-correlation coefficients are normalized cross-correlation coefficients.

4. The method of claim 3, wherein the estimating process involves dividing at least part of the first frequency range into first frequency range bands and computing a normalized cross-correlation coefficient for each first frequency range band.

5. The method of claim 4, wherein the estimating process comprises:

averaging the normalized cross-correlation coefficients across all of the first frequency range bands of a channel; and

applying a scaling factor to the average of the normalized cross-correlation coefficients to obtain the estimated spatial parameters for the channel,

wherein, optionally, the scaling factor decreases with increasing frequency.

6. The method of claim 5, further comprising the addition of noise to model the variance of the estimated spatial parameters,

wherein, optionally, the variance of added noise is based, at least in part, on the variance in the normalized cross-correlation coefficients.

7. The method of any one of claims 1-6, further comprising measuring per-band energy ratios between bands of the first set of frequency coefficients and bands of the second set of frequency coefficients, wherein the estimated spatial parameters vary according to the per-band energy ratios.

8. The method of any one of claims 1-7, wherein the estimated spatial parameters vary according to temporal changes of input audio signals.

9. The method of any one of claims 1-8, wherein the process of applying the estimated spatial parameters to the second set of frequency coefficients is part of a decorrelation process.

10. The method of claim 9, wherein the decorrelation process involves generating a reverb signal or a decorrelation signal and applying it to the second set of frequency coefficients.

11. The method of claim 9, wherein the decorrelation process involves selective or signal- adaptive decorrelation of specific channels and/or specific frequency bands.

12. The method of any one of claims 1-11, wherein the audio data are received in a bitstream encoded according to a legacy encoding process.

13. The method of claim 12, wherein applying the spatial parameters yields a more spatially accurate audio reproduction than that obtained by decoding the bitstream according to a legacy decoding process that corresponds with the legacy encoding process.

14. An apparatus comprising:

an interface; and

a logic system configured for performing all steps of the method of any one of claims 1 - 13.

15. A non-transitory medium having software stored thereon, the software including instructions adapted to control an apparatus to perform all steps of the method of any one of claims 1-13.